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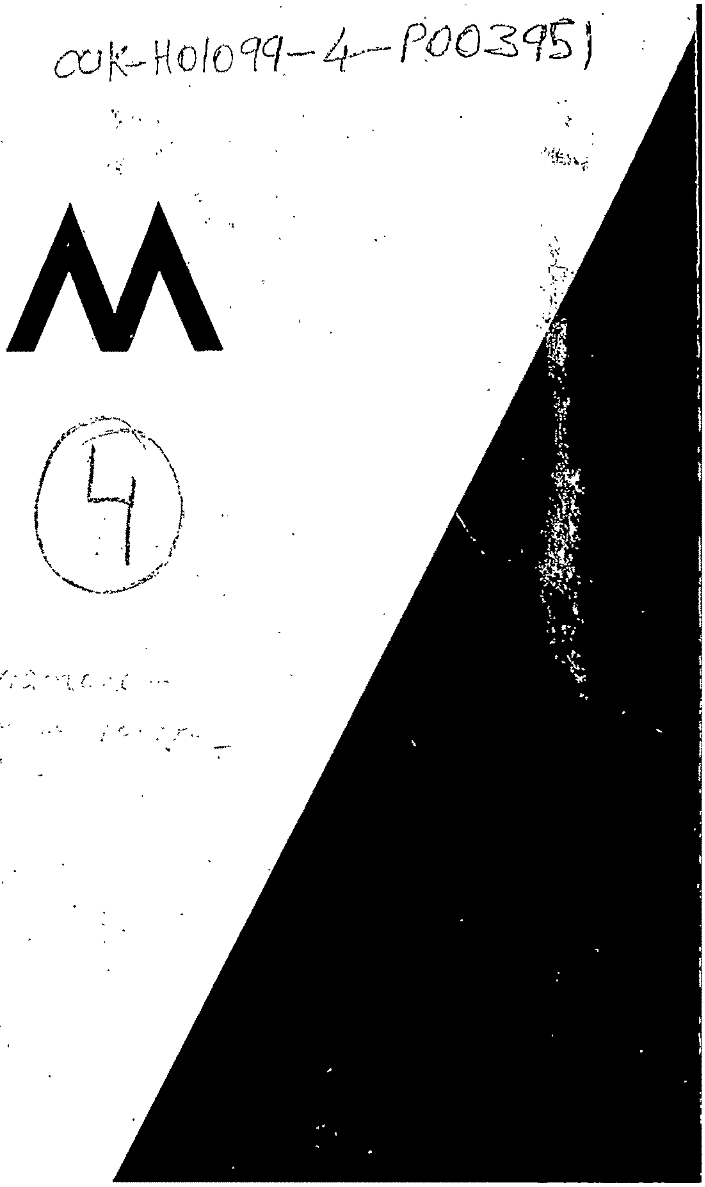

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# ACADEMY OF MANAGEMENT JOURNAL

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# *A Model of Corporate Performance as a Function of Environmental, Organizational, and Leadership Influences*[1]

**NAN WEINER**
**The Ohio State University**
**THOMAS A. MAHONEY**
**University of Minnesota**

*In a model of corporate performance incorporating environmental, organizational, and leadership variables, three performance dimensions—profit, profitability, and stock price—are examined for a sample of 193 manufacturing companies over a 19 year period. This research evaluates the work of Lieberson and O'Connor, a cornerstone for those arguing that the top leadership position of an organization is unimportant.*

How important is leadership in affecting the performance of organizations? One school of thought states that organizations—particularly large organizations—run themselves and that the incumbent in the top executive position is of little import (Hall, 1977; Cyert & March, 1963). Organizational and environmental constraints are presumed to limit drastically the influence any particular leader can exert. A leader, Hall argues, is important in times of organizational growth, development, and crisis, but for the most part organizations require maintenance and the organizational leader will make little difference in performance. This is not to say that the presence or absence of top leadership is unimportant, but that the particular incumbent of the leadership position is of little import. Empirical support for this position has been provided by a study by Lieberson and O'Connor (1972), which concluded that leadership influenced corporate performance less than did environmental or organizational factors.

Lieberson and O'Connor's work provides one of the few studies which has examined the relative influence of leadership, organizational, and

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[1] This study was partially supported by the University of Minnesota Computer Center.

environmental factors. Lieberson and O'Connor studied corporate performance. A similar study of municipal performance was conducted by Salancik and Pfeffer (1977). Both studies lend support to the thesis that top organizational leadership (chief executive officers and mayors, respectively) does not influence organizational outcomes greatly; no more than 15 percent of performance variance was explained by variance in individual leaders in either study. However, neither study identified the specific leadership, organizational, and environmental factors that are important determinants of organization performance; they merely attributed performance variance to these broad categories. The present study attempts to go beyond Lieberson and O'Connor's work and to identify specific environmental, organizational, and leadership variables that influence organizational performance.

Lieberson and O'Connor (1972) attempted to apportion variance of three dimensions of corporate performance to environmental, corporate, and leadership influences for 167 corporations over a 20-year period, 1946 through 1965. Profit, sales, and profit margin (profit/sales) were the performance dimensions studied. Environmental influences were represented by two variables—year and industry. Year was intended to capture economic conditions (e.g., interest rates, inflation, and labor shortages). The primary industry in which the corporation operated was intended to reflect more specific environmental influences (e.g., level of demand, technology, and competition for inputs and customers). Use of company as a variable was intended to represent the continuing influence of organizational factors; corporate differences such as size, location, facilities, suppliers, markets, and reputation were expected to affect organization performance. The leadership measure reflected all activities that took place during the term of office of a chief executive officer (CEO); this variable is denoted as stewardship throughout this paper. Using a decomposition of variance methodology analogous to analysis of variance, Lieberson and O'Connor sequentially apportioned corporate performance variance to year, industry, company, and stewardship, in that order. The variance of the performance measures associated with company ranged from 23 percent to 68 percent; that associated with industry was 19 percent to 29 percent; leadership 7 percent to 15 percent; and year 2 percent to 3 percent. Comparable results were obtained in Salancik and Pfeffer's (1977) study, which employed a similar methodology and year, city, and stewardship (mayor) to analyze the budget variance of 30 cities over an 18-year period, 1951 through 1968. Ten income and expenditure items of the cities' budgets served as dependent variables. Variance in budget items was found to be most heavily influenced by city, 55 percent to 91 percent, next by year, 3 percent to 17 percent, and then by mayor, 7 percent to 15 percent.

These two studies lead to similar conclusions. First, situational factors, particularly the organization, influence organizational performance. Second, individual leadership influences exercise an independent influence on performance, though the magnitude of such influence is not more than 15 percent. Third, environmental, organizational, and leadership influences differ, depending on the dimension of performance being considered. However, a deficiency in the methodology utilized in these two studies needs to be examined in order to evaluate the conclusions reached. The methodology employed a *sequential* apportionment of variance to year, industry, organization, and leadership, in that order. The potential deficiency of this approach is that results may be an artifact of the order in which variance is apportioned to the independent variables. If the independent variables were independent of each other, the order in which they are considered would have no effect. However, any interaction between the independent variables results in the underestimation of variance associated with variables assessed later. Stewardship was defined as organizational performance that occurred during the term of each top official; the term of office was denoted by specific year and company combinations. For example, leader 1 served in the first company from 1951 to 1956; the second leader served in the first company from 1956 to 1965; and the last leader served in the 167th company from 1960 to 1968. Thus, stewardship was not independent of the other independent variables. Weiner (1978) has shown that the methodology employed by Lieberson and O'Connor does capitalize on an order effect. She replicated Lieberson and O'Connor's results in a different sample of corporations using the same decomposition of variance methodology; stewardship accounted for 9 percent to 19 percent of the variance of the different measures of performance. To assess the potential order effect, Weiner then apportioned performance variance first to stewardship, then to year, industry, and corporation. In this analysis, stewardship accounted for 75 percent to 95 percent of performance variance. As previously noted, stewardship was defined as year by company combinations. Year accounted for very little (2 percent to 3 percent) variance, even when it was apportioned first; therefore, assessing stewardship variance first appears to result in the attribution to leadership of variance due to unspecified organizational characteristics. Variance originally attributed to industry also was captured by stewardship when performance variance was apportioned first to stewardship. Therefore, even the 19 percent to 29 percent of environmental influence that Lieberson and O'Connor attributed to industry may, in fact, reflect corporate factors. The performance variance associated with industry may actually be due to specific company characteristics; company size, for instance, varies by industry. However, leadership does account for some variance not strictly due to company: after variance was apportioned to year, industry, and company, stewardship still accounted for up to 19 percent of corporate performance.

Lieberson and O'Connor's examination of the relative influences of environmental, organizational, and leadership factors or organizational performance is an improvement over research that only investigates variables at a single level of analysis. However, their study merely incorporated different levels of analysis (e.g., year, industry, company, and leader) and sequentially apportioned variance to each. The present study attempts to improve on Lieberson and O'Connor's approach by specifying causal variables at different levels and utilizing simultaneous multivariate analysis to avoid the problem of sequentially considering each independent variable.

## MODEL OF CORPORATE PERFORMANCE

Corporate performance is a function of influences and organizational characteristics in addition to the choices of organizational leaders. Corporations face constraints and contingencies presented by environmental uncertainty, complexity, change, and munificence. In addition, at any point in time corporate leaders must operate within a set of fixed organizational characteristics which are the legacy of past management decisions. Corporate leaders make strategic choices that direct the organization's activities within these external and internal influences and that may make the difference between organizational success or failure. The specific environmental, organizational, and leadership influences examined in this study and their hypothesized effect on corporate performance are discussed below. First, however, the dimensions of corporate performance investigated in this study are discussed.

### Corporate Performance

The number of corporate performance measures that could serve as dependent variables is almost infinite. More important than the specific measures chosen is the use of multiple measures because different criteria of performance are likely to be differentially affected by environmental, organizational, and leadership factors (Lieberson & O'Connor, 1972). Three aspects of performance are considered in this study: profit level, profitability, and stock prices. Profit level was utilized by Lieberson and O'Connor so it is included in this study to facilitate comparison with their findings. Profit is a measure of corporate performance utilized by those within the corporation and by those in the relevant environment to evaluate the health of a firm. In addition, it is necessary for the long run survival of an organization. Profit is not a desirable measure, however, because it varies with organization size to a greater degree than with performance. Profitability is measured as profit relative to assets and is a preferred measure of relative performance. This measure assesses the efficiency with which plant, equipment, and current assets are transformed into profit. Profitability also permits comparison of performance efficiency across corporations of vastly different sizes. The third dependent variable, stock prices, reflects an evaluation of performance relative to the expectations of stockholders. In addition, stock prices influence the ability of corporate management to raise capital from equity markets (issuing stock) and thus represent a significant goal of corporations.

### Environmental Variables

Lieberson and O'Connor used year and industry as measures of environmental influences. Year presumably served as a proxy for general economic activity, which influences corporate performance. Gross National Product (GNP) is a more direct measure of economic activity and changes in the price level. Therefore, including GNP incorporated inflation as well as the real level of economic production as potential influences on corporate performance. The three dimensions of corporate performance are expected to vary directly with GNP.

Two industry variables, sales and concentration, were incorporated into the model to reflect specific environmental influences on corporate performance. Shared industry characteristics (e.g., technology, product demand, labor costs) filter the impact of general economic conditions so that firms within the same industry face a more similar environment. Because they reflect more specific environmental conditions, industry factors are expected to have a more direct impact than GNP on the dimensions of corporate performance studied. Industry sales indicate the level of economic activity within an industry and measure a specific aspect of the environment. Industry sales reflect the level of prosperity within an industry; therefore, they should be highly related to corporate profit in the industry. Further, stock prices will, in part, be a function of investors' perceptions of the health of the industry. Therefore, a positive association between stock prices and industry sales is expected.

Industry competition, as measured by the industry concentration ratio, is a second industry characteristic examined. Industry competition reflects the degree of dependence of firms within an industry on the environment. Firms in relatively less competitive markets are presumed to be less responsive to market conditions and more attuned to each other (Emery & Trist, 1965). The degree of concentration has been found to be related to a number of organization behaviors that impact on organizational performance, for example, pricing advertising, product differentiation, and technological innovation (Scherer, 1970; Lekachman, 1971). Firms in a highly concentrated industry are more likely to act in concert with respect to pricing than are firms in a more competitive industry. Thus, one might expect concentration to be associated with profitability and, to the degree that stock prices are reflective of profitability, with stock prices.

### Organizational Variables

Organizational size and technology have been discussed as important determinants of organization performance (Pugh, Hickson, Hinings, Macdonald, Turner, & Lupton, 1963; Meyer, 1968; Haas, Hall, & Johnson, 1963; Aldrich, 1972; Thompson, 1967). Corporate size reflects the resources available to the organization. The amount of economic activity the firm can engage in is directly influenced by corporate size. In addition, the ability to exploit the environment is a function of the amount of resources a corporation has. Furthermore, large size may minimize the influence that any single individual has in the organization (Hall, 1972). For example, changing top management has less effect on organization performance in large organizations than in small (Grusky, 1963; Kriesberg, 1962). Assets are used to measure corporate size.

Corporate size is expected to be positively associated with the three dimensions of corporate performance. Larger firms can take advantage of economies of scale enabling more efficient production and thereby increasing the ratio of profit to assets (profitability). In addition, larger firms have greater production capacity and should be able to generate greater sales; higher sales and greater efficiency should both contribute to a strong positive relationship between profit and size. Larger organizations are more stable and mature; they have demonstrated their ability to survive. Large corporations are able to pay stable dividends; therefore, investors seeking income stock are likely to bid up the price of stocks of such companies.

Technology determines the manner in which organizations transform inputs into outputs. One important aspect of technology that influences organizational productivity is the level of mechanization. A highly mechanized technology means greater fixed investment in capital and in methods requiring time and/or money to change. Thus the level of mechanization also reflects differing corporate capabilities across manufacturing firms. The level of technology was measured by capital-labor ratio in this study. Although organization characteristics such as size and technology are, in part, a function of past leadership decisions, these characteristics are relatively fixed in the short run and are constraints within which present corporate leadership must function.

Investments in capital assets per employee are expected to result in more efficient utilization of inputs to outputs and thus reduced costs. The net effect should be to increase profit and profitability. Technology is not likely to have an impact on stock prices directly.

### Leadership

Two approaches to defining leadership are used in this study. First, the same measure of leadership as employed by Lieberson and O'Connor is utilized; this is denoted as stewardship. Stewardship is defined by company and year coordinates. For example, steward 1 is the chief executive officer of the first company who served for three years; steward 2 is the chief executive officer of the first corporation for the 4th through 9th years of the study. Stewardship reflects all leadership influences occurring during the tenure of each top leader, regardless of the cause of the impact. The measure of stewardship is based on the assumption that top organizations operate differently, depending on who holds the top leadership position. The stewardship measure of leadership is lacking in explanatory relevance and attributes to leadership all variance associated with stewardship and not otherwise explained. A second approach to measurement of leadership influence attempts to correct this shortcoming.

The second approach to defining leadership is to incorporate leadership strategies into the model. Strategies are viewed as outcomes or a posteriori results of decision behavior and do not involve any speculation as to the intention of those managing the corporation (Mintzberg, unpublished). Rather, strategies are defined in terms of actual, observable patterns of corporate action or policy. Top leadership is expected to have a total organizational perspective and, as such, is involved in all organization policies. However, top management involvement can range from very peripheral to highly central. Gordon (1945) notes that procurement of financial resources is a function primarily of top corporate leaders. Capital can be obtained from external sources, issuing debt or selling stocks (equity), or from an internal source, retained earnings. A corporation's performance is affected by the organization's ability to acquire financial resources when needed and at a reasonable cost. Two financial strategies, capital structure and retained earnings, are utilized in this study in an attempt to represent decision making of top management.

Capital structure (debt-to-equity ratio) represents the proportion of financing obtained via debt relative to equity financing (issuing stock). A firm's debt-to-equity ratio affects a corporation's ability to borrow and the cost of borrowing. Profit is expected to be negatively associated with capital structure strategy because increasing debt creates a fixed financial obligation, interest. Further, lower profits mean less earnings from which dividends can be distributed, and so stock prices also are expected to be negatively related to capital structure strategy. Profitability (profit relative to assets) should be inversely related to capital structure strategy because increasing debt decreases profits and, in addition, debt often is obtained for purposes of expansion, thus increasing the organization's assets.

Retained earnings (percent of net earnings retained) provide autonomy for corporate management from dependence on external capital and equity markets (Galbraith, 1971). Retained earnings strategy is expected to relate positively to profit and assets, though the relationship with profits is expected to be stronger (Nerlove, 1968). Therefore, the relationship between profitability and retained earning strategy should be positive. Stock prices are expected to be positively associated with retained earning strategy. Firms attempt to pay stable dividends, and investors evaluate the stability of dividends in evaluating investments. An increasing proportion of retained earnings indicates that stable or slightly increasing dividend payments can be made.

### Timing of Leadership Influence

Leadership as defined by Lieberson and O'Connor measures organizational performance that occurred during the term of each top official.

**TABLE**
**The Hypothesized Relationships Between the**

| *Influences* | *Environmental* | | |
|---|---|---|---|
| *Performance Dimension* | *GNP* | *Industry Sales* | *Industry Concentration* |
| Profit | + | + | 0 |
| Profitability | + | + | + |
| Stock prices | + | + | + |

Each time the top officeholder changed, a new leader's influence was assumed to operate. However, this definition presumes that a leader's influence begins on assumption of office and ends when she/he terminates. This is an unrealistic presumption. A leader's influence requires some time to permeate the system before it affects organizational outcomes. Lagging the leadership measure is a means of assessing the long term rather than the immediate impact of the individual holding the top position. Lieberson and O'Connor found that lagging their leadership measure for two and three years had a substantial impact on the amount of profit margin variance explained but had no impact on profit and sales because almost all the variance was due to company. Two and five year lags of the leadership measure were investigated in the present study.

### Hypotheses

The hypothesized model is expected to account for a substantial amount of variance of the three performance dimensions studied. Specific hypothesized relationships between each of the performance dimensions and the variables in the model are presented in Table 1. Further, it is expected that lagging the stewardship variable will significantly increase the amount of performance variance explained.

## SAMPLE

A sample of 193 manufacturing corporations was randomly selected from the 1975 Compustat Industrial File. The Compustat File is a computer-readable library of financial, statistical, and market information compiled by the Compustat division of Investor's Management Services, Inc. (a subsidiary of Standard and Poor's, Inc.). The data included on the Industrial File are obtained from reports filed by the companies with the Securities and Exchange Commission, annual reports to stockholders, and other data obtained directly from the corporations (Investors Management Sciences, 1975). The sample was limited to manufacturing corporations because of the importance of the manufacturing sector in the

1

**Performance Dimensions and Variables in the Model**

| *Organizational* | | *Leadership* | | |
|---|---|---|---|---|
| *Corporate Size* | *Corporate Technology* | *Capital Structure Strategy* | *Retained Earnings Strategy* | *Stewardship* |
| + | + | − | + | + |
| + | + | − | + | + |
| + | 0 | − | + | + |

economy (i.e., it generates the largest proportion of net national income) and because of the availability of data for the manufacturing sector. The Primary Industrial File contains 613 manufacturing corporations, from which a random sample of 200 was selected. The sample appeared to be representative of the sample of manufacturing companies on the three stock exchanges. The actual sample was composed of 193 companies. Five companies founded in 1964 or later were eliminated from the sample because 40 percent of the data was not available. One company was eliminated by mistake, and a seventh corporation was eliminated because its corporate offices were in the Netherlands. Data for the 19-year period 1956 through 1974 were utilized for a total of 3,667 observations (193 companies × 19 years).

Firms listed on the Industrial File are biased toward large organizations. Over 90 percent (91.6 percent) of the manufacturing companies on the File are listed on the New York Stock Exchange, for which net tangible assets of $16 million are required. The results of the model tested on large firms may not be generalizable to smaller firms. Although corporate size was one of the independent variables included in the model, it should be kept in mind that the range within which size could vary was restricted by the source from which the sample of corporations was drawn.

Compustat collects data by fiscal year but denotes a year of data by reference to calendar years, for example, 1970. Data are denoted by the previous year for corporations with fiscal years ending January 1 through May 31. For example, data for a fiscal year beginning June 1, 1972, and ending on May 31, 1973, are reported as year 1972, whereas a fiscal year beginning on July 1, 1971, and ending on June 30, 1972, would be reported as the year 1972. Other data (e.g., industry data) used in the study are based on actual calendar year. Therefore, it is possible that corporate and industry data assigned to the same year may represent periods that differ by as much as six months. The stewardship measure also is collected annually (from Standard and Poor's *Register of Corporations, Directors and Executives*), but it is impossible to determine when in the year a new leader actually assumed office. Again, the company data and stewardship measure may not reflect an identical period, though the discrepancy cannot span more than a year.

## METHOD

Multiple regression analysis was utilized in the investigation of association between performance and the explanatory variables. The amount of profit, profitability, and stock price variance due to GNP, industry sales, industry competition, corporate size, corporate technology, capital structure strategy, and retained earnings strategy was assessed via multiple regression. The stewardship variable could not be included in the regression model in the conventional manner because of computer limitations; the computer could not handle the 538 indicator variables that would have been employed in the regression analysis to reflect stewardship. The impact of stewardship on each performance dimension was estimated after the variance due to other independent variables had been considered. The residuals obtained from each equation (one for each performance measure) were analyzed to determine how much of the remaining performance variance was due to stewardship. The results obtained are the same as if an analysis of variance had been performed on the residuals (Weiner, 1977); an analysis of variance could not be performed because of computer limitations. The procedure used to assess the amount of variance in the residuals due to stewardship is as follows. First, an adjustment factor was calculated:

$$AF_L = \bar{L}_i - GM$$

where $AF_L$ = adjustment factor for leader L for dependent variable of interest
$\bar{L}_i$ = mean of residuals for dependent variable of interest for each leader i
$GM$ = grand mean of residuals for dependent variable of interest.

Each residual was adjusted by its corresponding adjustment factor:

$$\text{Residual adjusted for leadership} = \text{Residual} - AF_L$$

For example, if the first 10 observations represent the term of one leader, the residuals for each of these ten cases were adjusted by the mean residual of these 10 cases; if the next 5 cases represent the term of the second steward, the mean residual of these 5 cases was subtracted from each of the 5 cases to remove the variance due to stewardship. Then the proportion of total variance due to leadership is estimated by calculating the proportion of variance removed by the adjustment factors:

$$R_R^2 = \frac{V_r^2 - V_{r/s}^2}{V_r^2} \times 100$$

and multiplying this by the amount of variance not explained by the regression model:

$$R^2 = (1 - R^2) \times R^2_R.$$

The total amount of explained variance that would have been obtained if leadership had been included in the regression equation is estimated by adding the explained variance from the regression model and proportion of total variance due to leadership:

$$R^{2'} = R^2 + R^2 s$$

where $R^2_R$ = proportion of remaining variance due to stewardship
$V^2_r$ = total variance of residuals
$V^2_{r/s}$ = variance remaining after data are adjusted for stewardship
$R^2_s$ = proportion of total variance due to stewardship
$R^2$ = variance of dependent variable of interest
$R^2$ = explained variance for total model including stewardship.

## RESULTS

Estimates of regression models for the three measures of corporate performance are presented in Table 2. For each measure of performance, the table presents the variance associated with the reduced model (without stewardship) and the estimated variance associated with the full model including stewardship (column 1), standardized regression coefficients and $\varrho$ value associated with each independent variable (columns 2-8), and an estimate of variance associated with stewardship considered after fitting the regression model (column 9). Each of the performance models is examined below. The correlation matrix of independent and dependent variables is found in Table 3.

### Profit

Of the variance of profit performance, 92 percent can be apportioned to variables in the full model (environmental, organizational, leadership strategies, and stewardship). The coefficients of three variables are statistically significant: size ($\beta = .939$, $\varrho = .000$), technology ($\beta = -.085$, $\varrho = .000$), and capital structure strategy ($\beta = -.027$, $\varrho = .001$). Multicollinearity between the size and technology variables is indicated by: (1) the negative partial regression coefficient between profit and technology, though the simple correlation is positive ($r = .42$); (2) the high intercorrelation between size and technology ($r = .53$); and (3) removal of technology

## TABLE 2
## Regression Model

| | | 1<br>Explained Variance[a] | 2<br>GNP[b] | 3<br>Industry Sales[c] | 4<br>Industry Competition[d] | 5<br>Corporate Size[e] | 6<br>Corporate Technology[f] | 7<br>Capital Structure Strategy[c,e] | 8<br>Retained Earnings Strategy[c,e] | 9<br>Stewardship[f] |
|---|---|---|---|---|---|---|---|---|---|---|
| Profit | (1) | .806 | .005<br>(.575)* | .006<br>(.515) | -.003<br>(.682) | .939<br>(.000) | -.085<br>(.000) | -.027<br>(.001) | .007<br>(.351) | |
| | (2) | .924 | | | | | | | | .128 |
| Profitability | (1) | .171 | -.130<br>(.000) | .029<br>(.120) | .054<br>(.001) | .029<br>(.134) | -.060<br>(.002) | -.387<br>(.000) | .041<br>(.011) | |
| | (2) | .545 | | | | | | | | .439 |
| Stock prices | (1) | .175 | .170<br>(.000) | -.003<br>(.870) | .073<br>(.000) | .276<br>(.000) | .037<br>(.052) | -.109<br>(.000) | .000<br>(.989) | |
| | (2) | .586 | | | | | | | | .470 |

Data sources: b—*Business Statistics: The Biennial Supplement to the Survey of Current Business, 1975*; Department of Commerce; c—*Quarterly Financial Report for Manufacturing, Mining and Trade Corporations*, Federal Trade Commission; d—*1967 Census of Manufacturing*, Department of Commerce; e—1975 Compustat Industrial File; f—Standard & Poor's *Register of Corporations, Directors, and Executives.*

(1) Reduced model without stewardship.

(2) Full model including stewardship.

[a] $R^2$ adjusted for number of variables in regression equation.

*$\varrho$ values

## TABLE 3
## Correlation Matrix of Independent and Dependent Variables

| | GNP | Industry Sales | Industry Competition | Corporate Size | Corporate Technology | Capital Structure Strategy | Retained Earnings Strategy | Profit | Profitability |
|---|---|---|---|---|---|---|---|---|---|
| Industry sales | .52 | | | | | | | | |
| Industry competition | .00 | .05 | | | | | | | |
| Corporate size | .15 | .10 | .04 | | | | | | |
| Corporate technology | .20 | .16 | -.04 | .53 | | | | | |
| Capital structure strategy | .02 | -.04 | .09 | -.04 | .03 | | | | |
| Retained earnings strategy | -.02 | .01 | -.03 | .01 | .03 | .01 | | | |
| Profit | .13 | .09 | .03 | .89 | .42 | -.06 | .02 | | |
| Profitability | -.13 | -.02 | .02 | .00 | -.08 | -.39 | .04 | .10 | |
| Stock prices | .21 | .12 | .08 | .34 | .22 | -.10 | .00 | .30 | .19 |

from the regression equation does not substantially change the amount of variance explained ($R^2 = .801$ vs. $R^2 = .806$).

As explained, corporate size ($r^2 = .79$) alone accounts for virtually all of the variance explained by the reduced regression model ($R^2 = .81$). It was noted earlier that profit level is an inadequate measure of performance because of this obvious relationship with corporate size. It was included in the analysis here for comparability with the Lieberson and O'Connor analysis. Stewardship accounts for 12.8 percent of variance of profit when considered subsequent to the regression analysis. The magnitude of the variance attributed to stewardship is similar to that obtained in Lieberson and O'Connor's study (8 percent) and in a replication analysis using the data employed here (16 percent) (Weiner, 1978).

The current analysis, Lieberson and O'Connor's original analysis, and the replication of Lieberson and O'Connor's study show a consistent pattern. Almost all of the variance of profit performance can be associated with the variables considered including stewardship, 92 percent, 96 percent, and 94 percent, respectively. In the original and replication studies the majority of this variance was associated with variation of company (68 percent and 51 percent, respectively) and industry (19 percent and 25 percent, respectively). The present study, which attempts to identify specific causal factors, found 79 percent of the variance of profit performance associated with company size. Thus, it appears that size, a company characteristic, accounts for the variance attributed to both industry and company in the decomposition methodology. Size, measured as assets, should be highly associated with profit performance, and the relationship between profit and assets is expected to be more direct than that between profit and company. There should be a linear relationship between profit and assets, not between profit and company. Thus, corporate size explains the earlier relationship between profit and company and reveals that relationship to be relatively uninteresting.

### Profitability

The full model (including stewardship) accounted for 54.5 percent of the variance of profitability (profit/assets). Most of the explained variance (43.9 percent) is attributed to stewardship. Because of the method of analysis employed, however, any causal inference is questionable. Variance attributed to stewardship is assessed from the residuals following estimation of the regression model, and it indicates merely that there are some nonrandom influences that have been omitted from the regression model. Stewardship is defined by specific year-company combinations. Thus variance associated with the measure of stewardship merely indicated that variation in profitability reflects year and company variability that may be a function of unspecified variables other than leadership incumbency.

Variables coefficients that are statistically significant in the analysis of the variance in profitability are capital structure strategy ($\beta = -.387$,

$\varrho=.000$); GNP ($\beta=-.130$, $\varrho=.000$); corporate technology ($\beta=-.060$, $\varrho=.002$); industry competition ($\beta=.054$, $\varrho=.001$) and retained earnings strategy ($\beta=.041$, $\varrho=.011$). Capital structure is the most important factor in predicting profitability; 15.2 percent of the variance of profitability can be attributed to capital structure strategy alone ($r=-.39$). All of the other variables combined (except stewardship) account for 17.8 percent. The negative relationship between profitability and capital structure strategy means that a corporation's rate of return on assets decreases as its level of debt increases. Increasing debt increases interest obligations which decrease profit. Increasing debt also increases total assets. Thus the observed relationship between capital structure and profitability results partly from relationships between variable definitions. The influence of capital structure on profitability does indicate an influence of leadership, however, and is of note in that respect.

The other four significant variables combined do not explain more than 1.9 percent of the variance of profitability and, with the exception of the unexpected negative relationship between profitability and GNP, they will not be discussed. This negative relationship indicates that assets increase more rapidly than do profits as GNP increases. GNP is an indication of the degree of munificence of the environment. Organizations tend to increase organizational slack when resources are available (Cyert & March, 1963). Increases in slack enable the organization to absorb more effectively potential variability in the environment. One use of slack is in building, enlarging, improving, or in other ways increasing capital assets. Thus, profit relative to assets might not be as high during times of munificence because a smaller proportion of resources is directed at short run profit generating activities.

### Stock Prices

Stewardship accounts for 47 percent of the variance of stock prices. Like the analysis of profitability, this is an indication that there are important company and leadership variables not included in the model.

Almost 18 percent (17.5 percent) of the variance of stock prices is explained by the reduced model. Coefficients of the following variables were statistically significant: corporate size ($\beta=.073$, $\varrho=.000$). These relationships are all in the predicted direction.

### Lagging Stewardship

Lagging stewardship two and five years had little impact on the amount of variance of performance dimensions associated with stewardship. Lieberson and O'Connor found that lagging stewardship one, two, and three years had no effect on the amount of profit variance explained, because 96 percent of profit variance was explained by year, industry, company, and unlagged stewardship. In the present study stewardship lagged two and five years also left the amount of profit variance explained virtually unchanged (changes of .3 percent and 1.4 percent, respectively).

A lagged analysis of stewardship increased the explanation of variance in profit margin (profit/sales) from 15.2 percent with no lag to 32.1 percent with a two year lag, and to 31.7 percent with a three year lag in Lieberson and O'Connor's study. Thus the effect of lagging stewardship in the analysis of profit margin variance was included in this study for comparison. A two year lag had no effect (decrease of .3 percent in explained variance), and a five year lag decreased explained variance by 5.4 percent. The amount of variance of profitability and of stock prices was unchanged (.3 percent and 0 percent, respectively) when stewardship was lagged two years. A five year lag resulted in a decrease of 9.3 percent of the variance of profitability and an increase of 11.8 percent of the variance of stock prices being attributed to stewardship.

Unlike Lieberson and O'Connor's results, lagging stewardship two years had no impact on the amount of performance variance explained; a five year lag had small to moderate impact on three performance dimensions—profit margin, profitability, and stock prices. Only in the case of stock prices did lagging stewardship increase the amount of variance explained; overall, lagging stewardship did not increase greatly the variance in performance associated with stewardship. There are a number of possible explanations for the lack of impact of lagged stewardship. First, the methodology is not sophisticated enough to distinguish between those managerial actions having a long versus short run impact. Second, some performance measures are likely to be more susceptible to long versus short run stages; stock prices, for example, were the only performance dimension that showed an increase when stewardship was lagged five years. Although stock prices can show sudden movement, stock prices probably reflect to a high degree a firm's reputation built over the long run, and it appears that top leadership has a long run impact on this.

## DISCUSSION

The proposed model accounts for a considerable amount of variance in profit performance but does not account for much variance in the other performance measures. Corporate size, the prime determinant of profit, is of relatively little explanatory interest, however, because of an obvious direct relationship between assets (measure of size) and profit. The regression model (without stewardship) explained relatively little variance (less than 20 percent) of profitability and stock prices. However, at least one variable at each level of analysis—environmental, organizational, and leadership—contributed to the understanding of profitability and stock prices. Profitability was a function of capital structure and retained earnings strategies (leadership), GNP and industry competition (environmental), and corporate technology (organizational). The variance of stock prices was associated with corporate size (organizational), GNP and industry competition (environmental), and capital structure strategy (leadership).

Consideration of stewardship in the analysis of profitability and stock prices accounted for an additional 40 percent of variance not explained by environmental, organizational, or leadership strategies—in sharp contrast with the findings of Lieberson and O'Connor and Salancik and Pfeffer. These different results are due in part to differences in methodological design and measures of variables, particularly environmental and organizational variables. In contrast to the previous studies, specific environmental and organizational measures were examined rather than attributing variance in performance to variance in year, industry, and company. Considerably less variance was associated with the specified environmental, organizational, or leadership strategy variables, leaving more variance to be associated with stewardship. The variance attributed to environmental, organizational, and leadership influences in Lieberson and O'Connor's and Salancik and Pfeffer's studies could not be explained in terms of specific attributes suggesting statistical associations in their analyses.

The attribution of variance to general classificatory measures is not adequate for a model of organizational performance; organizational performance should be explained causally. This study investigated some causal variables at three levels of analysis. Overall, the performance dimensions were related to the explanatory variables in the expected direction. However, many of the relationships were not as strong as originally expected. The three environmental variables studied—GNP, industry sales, and industry competition—had fairly low explanatory power. In fact, environmental factors may have relatively little influence on large, highly diverse organizations such as those studied. Large organizations often have more organizational slack to buffer them from environmental influences, and diversification may be a strategy to minimize environmental impact. The lack of influence of environmental factors on performance may be an indication that the corporations studied have succeeded in their attempts to buffer themselves from their environments. One or the other of two organizational variables—size and technology—is related to each performance dimension. Profit (not profitability) is highly associated with size. As expected, the level of profit is a function of size, but the rate of return on profit is more highly associated with technology. Stock prices are strongly influenced by corporate size; the decision to invest in stocks is based on economic conditions, but the decision to purchase a specific corporation's stock is based on company characteristics. Higher stock prices for larger companies may be due to larger profits and the ability of larger companies to pay consistently steady dividends. Of the two leadership strategies investigated—capital structure and retained earnings—only the former proved to be an important explanatory variable. Capital structure strategy was associated with all three dependent variables, most importantly with stock prices. Both profitability and stock prices were inversely related to capital structure strategy, as expected. These inverse relationships are a function of the different repayment obligations associated with debt versus equity financing. As debt increases relative to equity financing, the corporation faces higher fixed interest expenses which decrease profits and the valuation of the firm. The decrease in profit means less profit relative to assets, thus decreasing the measure of profitability. In addition, fewer profits may limit the funds from which dividends are distributed, making the firm's stock less desirable as an income investment.

Results of this analysis reinforce the argument made earlier that apportioning variance among categories such as year and industry which are applied to observations capitalizes on random associations and offers little insight into causal relationships. This is illustrated by the relatively large portions of variance in the dependent variables attributed to stewardship, the only categorical variable included in this analysis. Specific year, industry, organization, and leadership variables were hypothesized as influences of corporate performance and, although many of the relationships were statistically significant, they accounted for considerably less variance than the categorical variables studied by Lieberson and O'Connor. The failure to explain as much of the variance as Lieberson and O'Connor did may have been due to an unfortunate choice of variables. Alternatively, the variance Lieberson and O'Connor attributed to industry and organization may have reflected the sum of a large number of relatively small influences; there may be no large dominating influences of corporate performance such as analyzed here.

The deficiencies of the stewardship measure have been discussed. In addition, neither measure of leadership strategy was found to explain much variance. Therefore, means to identify causal variables of leadership at the corporate level are needed. The primary concerns of top leadership are interacting with the environment and making strategic decisions regarding the organization's mission. There are a number of means by which the role of top corporate leadership can be identified. Studying the differential influence of top executives of firms within a single industry makes it possible to control some environmental conditions affecting leadership styles within an industry. For example, increasing oil prices and the change in consumer preferences for smaller cars were realities faced by all automakers, yet only Chrysler has faced bankruptcy. Important leadership variables may be identified by looking at corporations whose performance is at variance with industry performance and then identifying those acts that are linked to leadership. In addition, it would be possible to trace industry trends back to the corporation that was the leader "in the field" and determine the role of the firm's top leadership. Third, a number of insights may be provided by the impact on the particular organizations of individuals who have held top leadership positions in different corporations within the same industry (e.g., Silverman in the TV industry and Iaococca in the auto industry). Although firms within industries face more similar environments than do firms in general, there still are organizational differences that may ultimately account for organizational performance.

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It therefore is necessary to look at leadership within corporations at different times in their history. Further, Hall (1977) argues that organizational leadership is important in times of growth, change, and crisis but that maintenance behaviors not leadership behaviors are required most of the time. The role that top leadership plays in mergers, reorganization, and redefinition of mission has been delineated to some extent; however, the maintenance role Hall refers to needs to be studied further because poor maintenance means that a corporation may not be able to handle a crisis successfully.

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# *Strategy, Structure, Size and Bureaucracy*[1]

**PETER H. GRINYER**
**MASOUD YASAI-ARDEKANI**
**University of St. Andrews**

*The same strong linkage between strategy and structure found in earlier studies using samples of large companies is found within a sample of 40 manufacturing companies in electrical engineering in the United Kingdom, ranging in size from 35-17,000 employees. Among other results, the correlation between company size and each of strategy and structure was found to be stronger than that between the latter, suggesting that the strategy/structure linkage is via size.*

Following the seminal work of Chandler (1962), which suggested that divisionalization followed geographic then product diversification among 70 U.S. companies, Scott (1971) developed a model of corporate growth. Salter (1968), Stopford and Wells (1972), and Franko (1971) showed that international geographical diversification of product markets was associated with the adoption of geographically based divisional structures. In parallel, Wrigley (1970), Pavan (1972), Thanheiser (1972), Dyas (1972), Channon (1973), and Rumelt (1974) showed that diversification and divisionalization were related in the United States and Western Europe, though only Rumelt (1974) applied statistical analysis. Channon (1975) subsequently replicated much of Rumelt's study using a sample of United Kingdom service companies with similar results. Implicit in these studies was the assumption that creation of a general office, and separation of central, top management from the details of operating decision taking by means of interposing divisional general managers, must promote better coping with a sometimes hostile environment (Galbraith & Nathanson, 1978). This belief is consistent with Franko's (1974) finding that diversified European international companies moved to divisional structures only as their environments became less benign.

These lines of inquiry were recently extended by Grinyer, Yasai-Ardekani, and Al-Bazzaz (1980) using a sample of 48 large UK companies.

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Their statistical analysis not only confirmed the highly statistically significant correlation between diversification and divisionalization found by Stopford (1968), Rumelt (1974), and Channon (1975) with other samples, but showed it to be independent of other important correlates of structure. Perhaps surprisingly, size was among those correlates, no doubt reflecting the lack of correlation between size and strategy. Degree of diversification and of divisionalization were also found by Grinyer et al. (1980) to be positively correlated with more conventional measures of macro-organizational structure, namely lateral and vertical spans of control of the chief executive. Their other findings—on relationships between the strategy/structure fit and perceived environmental hostility and financial performance—are of relevance to the general debate but are not of direct concern here.

In parallel with the work of Grinyer et al. (1980), a study of macro-organizational, strategic, and environmental characteristics of 45 UK electrical engineering companies was undertaken, the first results of which were published in Grinyer and Yasai-Ardekani (1980). Within this study, called the CUBS study hereafter for convenience, several propositions addressed by Grinyer et al. (1980) were examined more fully.

## HYPOTHESES

First, Grinyer et al. showed a linkage between strategy (diversification), structure (divisionalization), and certain configurational variables (lateral and vertical spans). Grinyer and Yasai-Ardekani (1980) similarly showed a highly significant, positive correlation between an ordinal measure of structural complexity, hereafter called structure, and these configurational variables as well as the Aston (Pugh, Hickson, Hinings, & Turner, 1968) measures of bureaucracy such as formalization, functional specialization, qualifications of officeholders, and decentralization of operational decision taking. These results suggested that bureaucracy, as what Child (1972) has called a "strategy of control," marks the divisional structure. As is suggested descriptively elsewhere (Berg, 1971; Channon, 1973; Grinyer & Spender, 1979), divisional organizations are more "structured" than are nondivisional ones. Staff specialists and capital budgeting, financial control, and corporate planning systems are introduced to coordinate and control lower hierarchical levels. The empirically based literature (above) suggests, though, that divisional structures are associated with diversification. Consequently, diversification may be expected to be associated in turn with bureaucracy. This suggest Hypotheses 1(a) to 1(h), as shown in Table 1.

Second, Grinyer et al.'s (1980) failure to find a significant relationship between size and strategy is perplexing. All the arguments seem to point in the direction of a positive correlation between size and diversification (strategy). Chandler (1962) had indicated that diversification entered at a relatively late stage of the growth of the company from its single product,

## TABLE 1
## Summary of Tests of Hypotheses

| *No.* | | *Hypothesis* | *Result* | *Significance Level* |
|---|---|---|---|---|
| 1. | (a) | Diversification is positively correlated with formalization of procedures. | Accepted | .001 |
| | (b) | Diversification is positively correlated with functional specialization. | Accepted | .001 |
| | (c) | Diversification is positively correlated with the qualifications of officeholders. | Accepted | .001 |
| | (d) | Diversification is positively correlated with the vertical span of the chief executive officer. | Accepted | .01 |
| | (e) | Diversification is positively correlated with the lateral span of the chief executive officer. | Accepted | .05 |
| | (f) | Diversification is positively correlated with the proportion of employees involved in administrative as opposed to direct labor. | Rejected | .05 |
| | (g) | Diversification is negatively correlated with the centralization of operating decision taking. | Accepted | .01 |
| | (h) | No significant correlation exists between diversification and the centralization of more strategic decision taking (on marketing and extra-budgetary expenditure). | Accepted | .05 |
| 2. | | Diversification is positively correlated with the size of the company. | Accepted | .001 |
| 3. | (a) | No significant correlation exists between size and structural complexity once allowance is made for the degree of diversification. | Rejected | .01 |
| | (b) | No significant correlation exists between degree of diversification and structural complexity once allowance is made for the size of the company. | Accepted | .05 |
| 4. | (a) | Diversification is positively correlated with the age of the company. | Accepted | .01 |
| | (b) | Structural complexity is positively correlated with the age of the company. | Accepted | .05 |
| | (c) | No significant correlation exists between age and degree of diversification once allowance is made for the size of the company. | Rejected | .05 |
| | (d) | No significant correlation exists between age and structural complexity once allowance is made for the size of the company. | Accepted | .05 |
| 5. | (a) | Diversification is positively correlated with the status of the company (i.e., whether branch, subsidiary, or independent company). | Rejected | .05 |
| | (b) | Structural complexity is positively correlated with the status of the company. | Rejected | .01 |
| | (c) | Diversification is positively correlated with the size of the parent company. | Accepted | .001 |
| | (d) | Structural complexity is positively correlated with the size of the parent company. | Accepted | .05 |
| | (e) | Diversification is positively correlated with the complexity of the design and development technology. | Accepted | .01 |
| | (f) | Structural complexity is positively correlated with the complexity of design and development technology. | Accepted | .05 |
| 6. | | Each of the relationships hypothesized in 5(a) to 5(f) ceases to be significant once allowance is made for the size of the company. | Rejected for 5(a), accepted for 5(b) to 5(f) | .05 |
| 7. | (a) | Structural complexity is positively correlated with the number of operating sites. | Accepted | .001 |
| | (b) | Structural complexity is positively correlated with the lateral span of the chief executive officer. | Accepted | .01 |
| | (c) | Structural complexity is positively correlated with the vertical span of the chief executive officer. | Accepted | .001 |

**TABLE 1 (cont.)**
**Summary of Tests of Hypotheses**

| *No.* | *Hypothesis* | *Result* | *Significance Level* |
|---|---|---|---|
| 8. | Each of the relationships hypothesized in 7(a) to 7(c) remains significant once allowance is made for the size of the company. | Accepted | .1 to .05 |
| 9. (a) | No significant correlation exists between diversification and structural complexity once allowance is made for bureaucratic characteristics of formalization, qualifications, specialization, and decentralization. | Rejected | .05 to .01 |
| (b) | No significant correlation exists between diversification and structural complexity once allowance is made for the status (i.e., whether branch, subsidiary, or independent company) of the company. | Rejected | .01 |
| (c) | No significant correlation exists between diversification and structural complexity once allowance is made for the size of the parent company. | Rejected | .01 |
| (d) | No significant correlation exists between diversification and structural complexity once allowance is made for the complexity of design and development technology. | Rejected | .01 |

narrow geographical origin. Growth of volume, and of geographical markets, before diversification ineluctably implies that diversified companies tend to be bigger. Moreover, absence of such a positive correlation is somewhat inconsistent with the well established relationships between size and bureaucracy (Pugh, Hickson, Hinings, & Turner, 1969; Hinings & Lee, 1971; Child, 1973; Yasai-Ardekani, 1979), bureaucracy and structure (Grinyer & Yasai-Ardekani, 1980), and structure and strategy (Stopford, 1968; Rumelt, 1974; Channon, 1975; Grinyer et al., 1980). On reflection, however, an explanation for the absence of a relationship between size and diversification may be seen to lie in the very sample used by Grinyer et al. (1980). Like earlier studies, the companies selected were drawn from a variety of industries, and virtually all were very large. Clearly, the point at which companies find it desirable to diversify as they grow varies from industry to industry, being related to market, resource, and legislative constraints as well as different opportunities to develop related products. By covering many industries the relationship between size and diversification therefore could have been obscured. Moreover, were growth to be related to diversification, the relationship would tend to be operative mainly among companies smaller than those in the sample. The CUBS study sample was ideal for testing this explanation. All its members were drawn from one industry, and they ranged in size from very small to large. This permitted adequate testing of the second hypothesis (Table 1).

Third, earlier researchers had found that Aston measures of bureaucracy are positively correlated with size of organization (Pugh et al., 1969; Hinings & Lee, 1971; Child, 1973); and as indicated earlier, Grinyer and Yasai-Ardekani (1980) found structure and these measures to be highly significantly positively correlated. Moreover, in earlier analysis of the CUBS sample the authors found structure and size to be strongly positively correlated, too. If the null form of Hypothesis 2 is rejected, these relationships between size and structure may well be attributed to increasing diversity and the problems this poses for central corporate management (Chandler, 1962; Grinyer & Spender, 1979). However, an alternative but not incompatible explanation is possible, namely, that size itself creates problems of integration and control to which adoption of a more complex organizational structure may be an appropriate response. In examining the relationship between the number of operating sites and divisionalization, for instance, Grinyer et al. (1980) provide support for such a proposition. Hypotheses 3(a) and (b) are tested, therefore, to determine whether the relationship between size and structure may be attributed to the strategy structure linkage and vice versa.

Size is not the only characteristic of a company that may be expected to bear on both its strategy and structure. Companies tend to take time to grow. Hence their age and size may be expected to be positively linked and thus diversification and structural complexity to be associated particularly with somewhat older companies—Hypotheses 4(a) and (b). However, these hypothesized relationships are assumed to be via size (growth) as an intervening variable. Many old companies do not expand far beyond their initial products and market places and thus are not involved in diversification or adoption of more complex organizational structures. Once allowance is made for size, therefore, any relationships between age and each of strategy and structure may be expected to become insignificant—Hypotheses 4(c) and (d).

A variety of other relationships with strategy and structure also are likely to be size dependent. For example, other things being equal, an independent company is more likely to be diversified and have a more complex organizational structure than a subsidiary, which may have its area of business defined by the higher hierarchical levels (its parent) on the basis of homogeneity and logic of the business. On the other hand, a small independent company may well be focused on a narrow product range, whilst a large subsidiary has a relatively broad one. Because large subsidiaries are likely to be found among large parents, the latter's size too may have a bearing. Finally, within the electrical engineering industry, diversification is likely to be achieved as much by design and development as by company acquisition. Hence one would expect diversified companies to have relatively complex design and development technologies. Yet even here one could argue that such complex technologies are economic only among larger companies. These considerations led to the fifth and sixth sets of hypotheses (Table 1).

A number of relationships with structure, however, may be independent of either size or strategy. Although number of operating sites may be seen as an aspect of size, adoption of a more complex organizational structure in itself may be a response to difficulties of coordination and control attending operations of large numbers of separate sites. Also, for reasons advanced in Grinyer et al. (1980), lateral and vertical spans of control may be related to structure independently of size. Thus Hypotheses 7(a) to 7(c) and 8 (Table 1) are suggested.

Finally, Grinyer et al. (1980) showed that the relationship between strategy and structure was very robust, being insensitive to control of a wide variety of variables. To these, further variables, in addition to size, may now be added. See Hypothesis 3(b). This suggests the set of null Hypotheses 9(a) to (d).

## METHOD

### Sample

Random sampling from 502 electrical engineering companies in the Southeast of England listed in the report on the "Census of Production, 1968, Directory of Business for the Electrical Engineering Industry" yielded a final sample of 45 companies distributed in size from 35 employees to 17,000 and over 8 sectors of the industry. See Grinyer and Yasai-Ardekani (1980), Table 2, for a fuller description of the sample. Of the 45 companies, 40 were involved solely in manufacturing and 5 in both manufacturing and service operations. Structured interviews were conducted between July 1975 and March 1976 to collect data from the chief executive or other senior manager to whom the researchers were referred by the executive in each of these companies.

### Scales

Development of the scales representing macro-organizational characteristics is discussed elsewhere (Grinyer & Yasai-Ardekani, 1980). Briefly, abbreviated Aston scales proposed by Inkson, Pugh, and Hickson (1970) were used to depict extent of formalization (use of written documents), functional specialization, and centralization. However, the centralization scale was subdivided into further scales following additional analysis: that for centralization of operating decisions was highly significantly negatively correlated with other interrelated measures of bureaucracy, for example, formalization, specialization, and professional qualifications of officeholders (Grinyer & Yasai-Ardekani, 1980). The configuration of the organizational structure was measured by the span of control of the chief executive, the number of hierarchical levels between him and the base of the pyramid via the longest chain of command (vertical span), the ratio of administrative to direct production workers (A/P ratio), and an ordinal scale of structural complexity drawn conceptually from the work of Chandler (1962), Scott (1971), Stopford (1968), Wrigley (1970), Channon (1973), and Rumelt (1974). This last scale, SHAPE, scores types of organizational structure in increasing order of complexity from owner-manager (0), through functional, elaborate functional, holding company, multidivisional without a well defined general office, fully multidivisional with general office, to elaborate multidivisional with partitioning on the basis of product and geography (6).

Two scales were used to measure strategy or degree of diversification. The first was that introduced by Wrigley (1970)—single product, dominant product, related product, and unrelated product strategies being scored successively from 1 to 4. A more refined scale was based on Rumelt's (1974) classificatory system. Single product, dominant constrained, dominant linked, dominant unrelated, related constrained, related linked, and unrelated strategies were scored from 1 to 7, respectively.

Finally, a number of scales measured other characteristics of the companies. Size was measured by the logarithm of the number of employees, size of parent as the logarithm of the number of employees controlled by the ultimate owning group, number of operating sites by their natural number, age by the number of years since foundation of the company, and status on an ascending scale from branch unit (0), through head branch with headquarters on the same site, subsidiary with legal identity, to principal unit (3). Following Pugh et al. (1969), the degree of automation of the most automatic piece of equipment was defined as automaticity range, this degree being measured on a scale from hand tools and manual machines (0), through powered machines, single cycle automated and self-feeding machines, automated repeat cycle machines, self-measuring and adjusting feedback machines, to computer controlled cognitive machines (5). Design and development technology was scored, after Perrow (1967), in an order of increasing complexity from occurrence of few exceptional situations which are analyzable (1), many exceptional situations which are analyzable, few exceptional situations which cannot be analyzed, to many exceptional situations which cannot be analyzed (4).

Correlations using ordinal scales, such as those for shape, strategy, automaticity range, and design and development technology, should be strictly nonparametric. However, Labovitz (1970) and Havlecik and Peterson (1977) have shown that the more discriminating Pearson's coefficient may be used safely, particularly where linearly equidistant numbers are applied to ordered categories, as for most variables in the CUBS study. Consequently, both methods were used, but only product moment coefficients are shown in the tables unless indicated to the contrary in the footnotes. Analysis was done for both the full sample and for the 40 manufacturing companies. Despite the greater homogeneity of the latter sample, the results were very similar, and consequently only those for the 40 solely manufacturing companies will be given here to reduce the complexity of presentation.

A variety of other scales were introduced into the analysis but, because the results were of less interest, are excluded from discussion here. Results of analysis using them may be found in Yasai-Ardekani (1979).

## RESULTS OF STATISTICAL ANALYSIS

In developing the hypotheses, reasons were advanced for expecting a positive correlation between the degree of diversification (strategy) and a

## TABLE 2
## Correlations Between Strategy, Structure, Size, and Measures of Bureaucracy

| | *Diversification Strategy (Wrigley's, 1970)* | *Diversification Strategy (Rumelt's, 1974)* | *Structure (Shape)* | *Size (Log)* |
|---|---|---|---|---|
| 1. Chief executive's span of control | .23*N | .26*N | .42** | .36* |
| 2. Vertical span of control | .44** | .37* | .57*** | .76*** |
| 3. Administrative/production (A/P) ratio | .19SN | — | .30**N | .27*N |
| 4. Type of structure (shape) | .51*** | .49*** | 1.00 | .59*** |
| 5. Professional qualifications | .49*** | .45** | .30* | .76*** |
| 6. Formalization | .49*** | .47** | .42** | .69*** |
| 7. Functional specialization | .52*** | .46** | .46*** | .86*** |
| 8. Centralization | −.41** | −.34* | −.34* | −.63*** |
| 9. Centralization of operating decisions | −.44** | −.38* | −.42** | −.68*** |
| 10. Size (log) | .66*** | .61*** | .59*** | 1.00 |

N: Kendall's tau correlation coefficient (shown only where significant and when the Pearson's product moment correlation is insignificant).

S: Strongly suggestive at .1 level.

*$p < .05$

**$p < .01$

***$p < .001$

number of intercorrelated measures of bureaucracy (Grinyer & Yasai-Ardekani, 1980), and size. Table 2 shows the correlation coefficients that bear upon Hypotheses 1(a) to 1(h) and 2.

No matter whether Wrigley's (1970) or Rumelt's (1974) scales for strategy are adopted, diversification and structure are highly significantly, positively correlated, consistently with earlier empirical studies. Similarly, although at varying degrees of significance, both measures of diversification are positively correlated with all the measures of bureaucracy except the ratio of administrative to direct production employees. Clearly, diversified companies with more complex organizational structures within the UK electrical engineering industry are using bureaucracy as a strategy of control to a greater degree than are those restricting themselves to a more narrow range of business. There is no evidence, however, that this leads to the greater administrative overheads associated with a more complex organizational structure (see row 3 of Table 2) or bureaucracy (Grinyer & Yasai-Ardekani, 1980) suggesting that other forces are entering to offset the growth of the administrative/direct production worker ratio as diversifying companies adopt more complex organizational structures and become more bureaucratic.

These correlations are put into perspective by those between size and each of the other variables. Size consistently explains a much greater proportion of the variance in the structural variables, including structural complexity, than does diversification (strategy). Moreover, it is more strongly correlated with diversification than the latter is with the structural variables. Contrary to the findings of Grinyer et al. (1980), the results of the CUBS study suggest that the correlation between strategy and each of structure and bureaucracy may well be via size. As companies diversify, they become larger, and then adopt more bureaucratic, more complex organizational structures. This difference between the study of Grinyer et al. (1980) and the CUBS study no doubt lies in the composition of the samples. Because the CUBS sample included a wide range of sizes, from very small to large companies, it was possible to observe different stages of growth (Scott, 1971), a possibility denied to Grinyer et al. because of the large size of all their 48 companies.

Table 3 shows the results of partial correlation to explore the effects of controlling for size, structure, strategy, and other pertinent measures of bureaucracy. Only Wrigley's (1970) scale for diversification is shown in this table because of the greater proportion of variance explained by the zero order correlations using this rather than Rumelt's (1974) scale (see Table 2). The considerable influence of size is clear. Significant positive correlations between strategy and structure remain unaffected by controlling for any of the measures of bureaucracy. Similarly, the positive correlations between strategy and the key measures of bureaucracy—namely, qualifications, formalization, functional specialization, and decentralization—remain significant, even when allowance is made for the association of structure with bureaucracy. The strength of these relationships is such that only vertical and lateral spans of control remain significantly correlated with structure when control is exercised for strategy. Yet all the correlations with strategy, and all but those for lateral span of chief executive's control and qualifications of officeholders with structure, become insignificant when controlling for size. Moreover, the sign is reversed for qualifications, indicating that the product moment coefficients between size and each of qualifications and structure are considerably greater than that between qualifications and structure. So great is the influence of size that even the strong correlation between strategy and structure is no longer significant when allowance is made for it. Size remains highly correlated with each of strategy and structure when controlling for the other. Size is obviously the dominant, possibly intervening, variable with respect to both diversification and macro-organizational characteristics.

Table 4 bears on the fourth and fifth sets of hypotheses (Table 1). As anticipated, companies tend to become more diversified as they age, when they have larger parent companies, have more operating sites, and in the process have more advanced technology and more complex design and development technologies. Contrary to expectations, companies of lower status (subsidiaries) tend to be more diversified. Although subsidiary companies in the CUBS sample are among the larger companies, as will be seen later, this relationship is not wholly attributable to larger size. Similarly, but in most instances more weakly, structure is associated with these same attributes of companies. Size of companies, however, also is strongly correlated with them, most strongly with the number of operating sites, parent company size, automaticity range, and design and development technology.

## TABLE 4
## Correlations Between Strategy, Structure, Size, and Other Company Characteristics

| | *Diversification Strategy (Wrigley's, 1970)* | *Diversification Strategy (Rumelt's, 1974)* | *Structure (Shape)* | *Size (Log.)* |
|---|---|---|---|---|
| 1. Age | .41** | .41** | .31* | .31* |
| 2. Status | -.37* | -.41** | -.31**N | -.31**N |
| 3. Number of operating sites | .43** | .44** | .57** | .66*** |
| 4. Automaticity range | .43** | .40** | .31* | .73*** |
| 5. Design and development technology | .46** | .42** | .19*N | .47*** |
| 6. Parent company size (log.) | .50*** | .47** | .36* | .58*** |

N: Kendall's tau correlation coefficient (shown only where significant and when the Pearson's product moment correlation is insignificant).

*$p<.05$

**$p<.01$

***$p<.001$

This again indicates the importance of partial correlations controlling in particular for size. Results are shown in Table 5. The relationship between strategy and structure is shown, as by Grinyer et al. (1980) who controlled for some of these variables as well as others, to be unaffected by age, status, number of sites, parent size, or production or design and development technologies, and to be robust in this respect. Similarly, the correlations of strategy with each of age of company, status, parent company size, automaticity range, and complexity of design and development technology remain significant even when controlling for structure. The dominance of the relationships between these company characteristics and strategy is underlined by the fact that their relationships with structure become insignificant in all cases when controlling for strategy. However, from the third row of the table it is clear that companies with more sites tend to adopt a more complex structure irrespective of strategy.

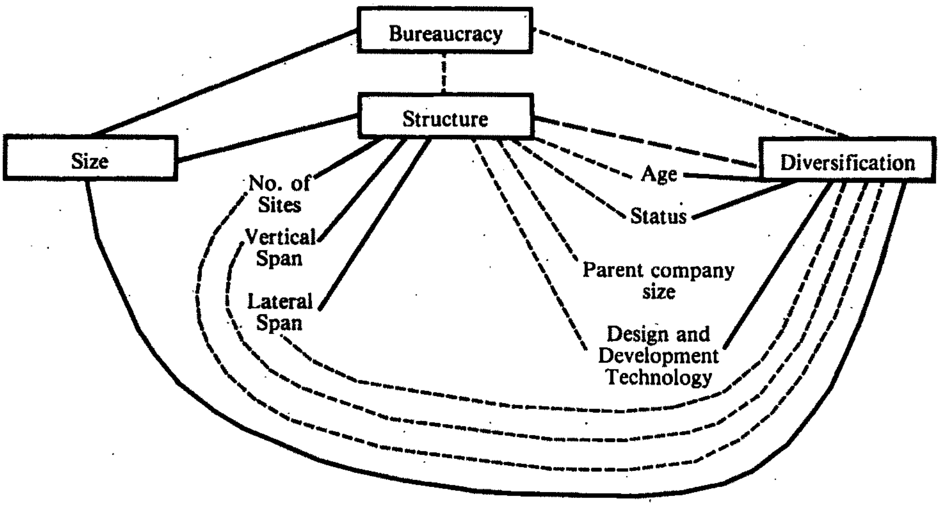
Again, however, many of these apparent relationships with strategy may be attributed to size, for only the partial correlations with age and status remain significant once allowance is made for company size. This in itself is important, however, for it clearly indicates that, irrespective of size, older companies and subsidiaries tend to be more diversified. Absence of family ownership among the subsidiary companies might have permitted greater diversification of product market posture (Channon, 1973). It is of equal note that the only correlation of company characteristics with structure that remains significant when controlling for size is that for the number of operating sites. Not only does it indicate the importance of size, but it provides further empirical support for the argument of Grinyer et al. (1980) that divisional structures may be adopted in some companies to meet the problems of coordinating geographically separate business units irrespective of their size or strategy.

## TABLE 5
## Partial Correlations Between Strategy, Structure, Size, and Other Company Characteristics

| | *Partial Correlations with Strategy, Controlling for Log. Size* | *Partial Correlations with Structure, Controlling for Log. Size* | *Partial Correlations with Strategy, Controlling for Structure* | *Partial Correlations with Structure, Controlling for Strategy* | *Partial Correlations Between Strategy and Structure, Controlling for the Variable Shown in the Row* |
|---|---|---|---|---|---|
| 1. Age | .29* | — | .30* | — | .44** |
| 2. Status | -.29* | — | -.33* | — | .48** |
| 3. Number of operating sites | — | .30* | — | .45** | .35* |
| 4. Automaticity range | — | -.22S | .34* | — | .43** |
| 5. Design and development technology | — | — | .43** | — | .48** |
| 6. Parent company size (log.) | — | — | .40** | — | .40** |

S: Strongly suggestive at .1 level
*$p < .05$
**$p < .01$

**FIGURE 1**
**Diagram of Tests of Hypotheses**[a]



[a] All relationships shown, with the exception of those for status, are positive.
———— Significant relationship independent of bureaucracy, structure, and strategy.
-------- Significant relationship dependent on size.
— — · — Significant relationship dependent on size but independent of all other variables shown.

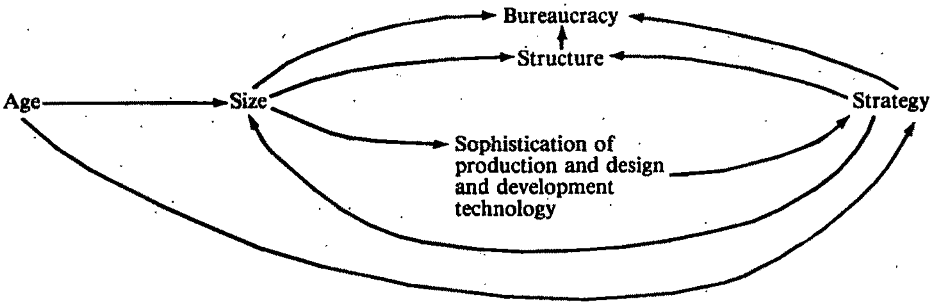
## CONCLUSIONS

The main results of the statistical analysis are summarized in Table 1. Figure 1 also shows the results of testing the hypotheses listed in Table 1. One may move beyond these separate hypotheses, however, to highlight the main implications of the findings.

As found in all earlier studies cited above, the relationship between strategy and structure is found to be strong and largely independent of other macro-organizational and other company characteristics bearing on both. Moreover, not only is strategy associated with structure, both are attended by greater use of bureaucracy as a "strategy of control" (Child, 1972), with age, status, size of parent company, and complexity of production and design and development technologies. These relationships with technology may reflect the tendency of much diversification within the electrical engineering industry in the United Kingdom to stem from internal development of new products. Relationships with such company characteristics are stronger for strategy than structure, however, suggesting that the relationships with structure may well be attributable to strategy. This suggests that structure may well follow strategy. A picture emerges, then, of companies diversifying as they age and in the process becoming more technologically advanced but above all larger. This accords well with the models of diversification and divisionalization as stages within the growth and maturation of companies (Chandler, 1962; Scott, 1971).

This orthodox interpretation is called into question by the dominance of size. The strategy, structure, bureaucracy nexus is clearly size dependent. More complex, bureaucratic, organizational structures may, then, be seen as a response to difficulties of coordination and control generated by larger size as well as by diversity of product market posture, as suggested by Williamson (1971). The analysis indicates, too, that this may be the organizational answer to the problems of coordinating a large number of operating sites. This is not to deny the possible validity of the link between strategy and structure, however, for the results are consistent with the proposition that companies grow as they diversify, or vice versa, and adopt a more complex, bureaucratic structure to meet the difficulties of directing, understanding, coordinating, and controlling the interface of their production and marketing operations with their environments that both such diversity per se *and* size generate.

**FIGURE 2**
**Causal Linkages**


Bureaucracy
Structure
Age
Size
Strategy
Sophistication of production and design and development technology

Possible causal linkages, consistent with both the present and earlier empirical findings, are illustrated in Figure 2. Three features are of particular interest. First, age may induce diversification, even if the company is not large. Here the assumption is that the company is either escaping from a mature or declining industry or alternatively expanding beyond the constraints its initial business imposes. Second, the relationship between size and diversification is two-way. Diversification normally leads to greater size, because of the sales generated by new internally developed products or markets, or the sales, assets, and employees added by acquisition of other companies. In turn, size permits complex technology and, in particular, design and development, which add more technologically new products and hence diversification. Third, neither strategy nor size is linked to bureaucracy solely via structural type. Decisions may be delegated to qualified specialist subordinates within the constraints of a formal procedure to overcome the problems of complexity of coordination and control inherent in both a diverse range of businesses and/or size, whether or not a multidivisional structure has been adopted. It just so happens that multidivisional structures also demand delegation, qualified staff, specialized posts, and formal procedures to allow the effective separation of the head office from subsidiary operations (Chandler, 1962; Grinyer & Spender, 1979).

Whether or not this speculative causal model is accepted, it is clear that the strategy/structure linkage cannot be examined independently of size, as has been done often in the past. Perhaps the only resolution to the issue of the exact nature of the nexus between strategy, size, and structure will be via longitudinal or, more likely, historical studies of the kind undertaken by Chandler (1962). Study of the strategy/structure linkage may, then, be ripe for a full turn of the cycle—a return to the methodology of its fountainhead.

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# *Integration and Specialization in Academic Research*[1]

**PHILIP H. BIRNBAUM**
**Indiana University**

*The effects of integration and interdisciplinary characteristics on seven performance measures are examined over time for academic research projects in agreement that outputs are important goals of the project. The results support the argument that integrating specialized academic researchers reduces their performance when measured by output goals whose importance was previously agreed upon.*

Integration in organizations has long been of concern to organizational analysts. Motivated by the work of Lawrence and Lorsch (1969) and others, there has been substantial work on how organizations achieve successful performance through integration. However, one important type of organization, the university, has been characterized as an exception to the integration view of organizational success. Universities have been described as organized anarchies because they have problematic preferences, unclear technologies, and fluid participation (Cohen, March, & Olsen, 1972). Weick (1976) has described universities as loosely coupled systems because their subsystems are relatively independent so that actions taken in one subsystem have little effect on, or are relatively slow to affect, another subsystem. Organized anarchies and loosely coupled systems such as universities pose anomalies to the concept of improving organizational performance through integration of differentiated functions.

While the view of universities as organized anarchies and loosely coupled systems has recently emerged as a competitive alternative to the integrated view, the interdisciplinary research movement has been gaining momentum within funding agencies and universities (Cunningham, 1969). Interdisciplinary research is concerned with integrating the research expertise of different specialized disciplines on common problems, as opposed to multidisciplinary research in which researchers representing different

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disciplines work on problems relevant to their own discipline without integration. The emphasis on integrated effort characterizes interdisciplinary research activity alone. This emphasis on integration persists even though the literature contains numerous examples of the problems experienced in attempting to integrate academic interdisciplinary research efforts (Council of Graduate Schools in the U.S., 1969; Engineering College Research Council, 1964; Kast, Rosenweig, & Stockman, 1970; Burroughs, 1972).

It is well recognized that academic researchers exchange research outputs in the form of articles, books, and papers for professional visibility and prestige within the scientific community (Blau, 1974; Hagstrom, 1965). There also is evidence that both academic researchers and research managers are congruent in using research outputs as measures of research performance (Chan, 1978; Gross & Grambach, 1968; Jauch & Glueck, 1975). Research teams produce outputs such as articles (Cole & Cole, 1967, 1968; Cox & Catt, 1977; Drew & Karpf, 1975; Hagstrom, 1971; Henry & Burch, 1974; Jauch & Glueck, 1975; Lightfield, 1971), books (Glaser & Taylor, 1973; Lightfield, 1971; McClarrey & Edwards, 1973), and papers (Chan, 1978; Glaser & Taylor, 1973; Jauch & Glueck, 1975). They also produce technical reports (Chan, 1978; Farris, 1966; Glaser & Taylor, 1973; Pelz & Andrews, 1966; Shaw, 1967), patents (Box & Cotgrove, 1968; Chan, 1978; Farris, 1966; Smith, 1971), and students (Chan, 1978; Jauch & Glueck, 1975; Nava, 1975). Therefore, to the extent that an academic research team agrees that research outputs are important organizational goals, such outputs in the form of articles, books, papers, technical reports, patents, and students may be used as criteria in evaluating the team's performance.

Interdisciplinary research has been shown to be particularly well suited for more difficult problems with many interrelationships that were not covered by existing knowledge and that were very difficult to define (Birnbaum, 1980). As a result, publications and other products may be harder to achieve than for more unidisciplinary research teams. In addition, some forms of interdisciplinary research output, such as articles, may be difficult to publish. Journal editors may be reluctant to publish the results of interdisciplinary research that lie outside the narrow interests of their primary readership. However, other forms of research output such as books, papers, technical reports, and students graduated should not be affected by whether the research is interdisciplinary or not. These are products useful to a more general market than the specialized journal article.

These views suggest that academic interdisciplinary research exists in the context of a loosely coupled organizational anarchy and is made up of academic researchers who share the values of independence and the desire for professional visibility through publications. If this is the case, attempts toward tight integration of such individuals probably will be resisted, and performance, as reflected in agreed-upon outputs, should suffer. Running counter to the larger academic culture, integration in cross-disciplinary research may not be as desirable as its proponents have argued. The external emphasis on integrated cross-disciplinary research efforts by funding agencies and university administrators may not be desirable when research outputs such as those described previously are expected. Integrated effort, however, may be appropriate in other circumstances, such as in solving very difficult problems when the output desired is an integrated solution and not a report of the effort, or a patent, or student graduate. However, in this study, the author is not in a position to evaluate the appropriateness of interdisciplinary research for the type that does not result in a report (i.e., article, book, technical report, paper), a patent, or graduated students. The present study, based on the longitudinal study of a nationwide sample of academic interdisciplinary research projects, examines the following central hypothesis: *If academic research groups agree on the importance of research outputs as organizational goals, then higher performing groups will have fewer interdisciplinary characteristics and will be less integrated.*

## METHOD

### Sample

A stratified sample of 84 interdisciplinary research projects was drawn in 1975 from: Harvard University; Massachusetts Institute of Technology; Stanford University; the University of California at Berkeley, Los Angeles, San Diego, and San Francisco; University of Chicago; University of Houston; University of Illinois; University of Ottawa; University of Pennsylvania; University of Southern California; University of Washington; and the University of Wisconsin. The U.S. institutions were among the top 22 in terms of federal research support and accounted for 45 percent of all federal research obligations to universities for fiscal year 1973, the latest figures available at the time of selection.

The first stratum of 43 projects was judgmentally selected by interdisciplinary research managers familiar with where such research was underway, in order to increase the representativeness of the sample. The second stratum of 41 projects was drawn using proportional random sampling without replacement from a sampling frame of 103 projects constructed using the *Research Centers Dictionary* (Palmer, 1972) and its latest supplements. Potential bias in sampling due to drawing only these projects under the aegis of a center or institute was partially solved by including projects in the judgmental stratum that were independent of centers or institutes. These two strata were combined in the analysis by weighting each by the inverse of its sampling ratio in order to adjust for over and under sampling.

The projects in the sample drawn varied in their degree of interdisciplinary characteristics from a low of 50 percent to a high of 88 percent. These characteristics are described in greater detail under the description of independent variables. Although the sampling procedures were intended to allow inferences to be drawn to the population of interdisciplinary projects, the lower characteristic groups drawn probably are not unlike many noninterdisciplinary research teams. This is because research teams are made up of individuals who vary in their personal characteristics and life histories and who, therefore, bring differing points of view and problem solving approaches to bear on research problems.

Data were gathered in 1975 by personal interviews, historical records, and questionnaires. Interviews were conducted and historical records gathered from principal investigators, project members, and institute directors. Questionnaires were left with each group, and projects were considered to be usable data points when one principal investigator and at least one other project member had returned completed questionnaires. This size was necessary in order to include some two-person interdisciplinary research projects. An overall 94 percent response rate of questionnaires was received. This was reduced to 80 percent when the usability criteria were applied. In the majority of instances when groups had to be rejected, it was due to insufficient responses from group members and not to principal investigators. Those groups rejected appeared to be similar enough in response pattern to the 67 projects retained in the sample, based on principal investigator responses, to rule out the possibility of bias due to nonrepresentativeness of the retained cases.

In 1977, data were gathered by questionnaires and historical records from projects that were retained in the 1975 sample. Responses were received from 61 of the original 67 projects, of which 59 were usable, for an 88 percent usable response rate. Of the six nonrespondents, the principal investigators of three projects were unable to respond in time due to being out of the country; the three others chose not to respond for unknown reasons.

The 1977 sample of 59 projects was initially examined for leader-member agreement on the importance of output goals based on their responses to the 1975 questionnaire. These responses were to questions based on Gross and Grambach (1968) which asked the relative importance (great—some—little—no) to the following goal types: (1) develop a specific product that with response to scientific rigor is absolutely top quality, (2) develop a specific service that with respect to scientific rigor is absolutely top quality, (3) carry on "applied" research—seek to apply knowledge to a specific problem, and (4) develop a useful project or service. In the 1977 sample, 41 projects (69 percent) were identified in which leaders and members agreed that these output goals were of great or some importance. It is on this subset of projects, in which leader-member agreement existed on output goals, that the subsequent analysis was performed. As the comparison of characteristics between the total 1975, total 1977, and the 1977 agreement sample in Table 1 indicates, the demographic differences are slight. Listwise deletion of missing values was used in the analyses to insure that the 1977 agreement sample and 1977 sample were matched for all computations.

**TABLE 1**
**Characteristics of 1977 Agreement, 1977 Total, and 1975 Total Samples**

| | *1977 Agreement on Output Goals* | | *1977 Total* | | *1975 Total* | |
|---|---|---|---|---|---|---|
| *Characteristics* | *Number* | *Percent* | *Number* | *Percent* | *Number* | *Percent* |
| *Geographic dispersion* | | | | | | |
| West-U.S. | 26 | 63 | 37 | 63 | 42 | 63 |
| Midwest-U.S. | 9 | 22 | 15 | 25 | 17 | 25 |
| South-U.S. | 1 | 2 | 1 | 2 | 1 | 1 |
| East-U.S. | 4 | 10 | 5 | 8 | 6 | 9 |
| Canada | 1 | 2 | 1 | 2 | 1 | 1 |
| | 41 | 100 | 59 | 100 | 67 | 100 |
| *Public-private universities* | | | | | | |
| Public | 33 | 80 | 49 | 83 | 54 | 81 |
| Private | 8 | 20 | 10 | 17 | 13 | 19 |
| | 41 | 100 | 59 | 100 | 67 | 100 |
| *Affiliation* | | | | | | |
| Center/institute/laboratory | 29 | 71 | 47 | 80 | 54 | 81 |
| Independent of center/ institute/laboratory | 12 | 29 | 12 | 20 | 13 | 19 |
| | 41 | 100 | 59 | 100 | 67 | 100 |
| *Subject area of research* | | | | | | |
| Biological science | 13 | 32 | 21 | 36 | 26 | 39 |
| Engineering | 12 | 29 | 13 | 22 | 14 | 21 |
| Physical science | 6 | 15 | 8 | 14 | 9 | 13 |
| Social science | 10 | 24 | 17 | 29 | 18 | 27 |
| | 41 | 100 | 59 | 100 | 67 | 100 |

The researchers represented over 50 separate disciplines and worked on projects which included research on electrical properties of bone, on epilepsy, deep sea drilling, arms control, urban transportation, mental retardation, pollution control, social indicators, and space exploration. Projects ranged in size from 2 people to as many as 70, with the median size between 5 and 6 people, and ranged in age from 3 to 22 years. Of the projects, 85 percent were in the implementation or concluding stages of their research, with 15 percent completing the project between 1975 and 1977. Of those completed, only three projects were unable to obtain continued funding when it was sought.

### Independent Variables

Two independent variables were used in this study: (1) the extent of interdisciplinary characteristics in the research group and (2) the level of achieved integration. Group members were asked to indicate the presence or absence of the following eight features that characterize the construct (Alpert, 1969; Blackwell, 1955; Caudill & Roberts, 1951; Luszki, 1957, 1958; Michaud, 1969): (1) different bodies of knowledge are represented in the research group, (2) group members use different problem solving approaches in attempting to solve problems, (3) members of the group perform different roles in solving problems, (4) the group shares common facilities, (5) members of the group work on a common problem, (6) there

**TABLE**
**Intercorrelation Matrix of**
(*N* =

| | *AQUAL* | *LGART* | *LGBK* |
|---|---|---|---|
| (1) Article quality (AQUAL) | 1.00 | | |
| (2) Log of article quantity (LGART) | .03 | 1.00 | |
| (3) Log of book quantity (LGBK) | .13 | .15 | 1.00 |
| (4) Log of paper quantity (LGPAP) | .10 | −.27 | −.23 |
| (5) Log of technical report quantity (LGTR) | .12 | .20 | −.36 |
| (6) Log of patent quantity (LGPAT) | −.20 | .27 | .06 |
| (7) Log of students graduating (NSTU) | −.40 | .54 | .33 |
| (8) Integration (I) | −.02 | −.41 | .13 |
| (9) Interdisciplinary characteristics (C) | .05 | −.22 | −.32 |
| (10) Interaction (CI) | .02 | −.44 | −.19 |

is group responsibility for the final product, (7) the nature of the problem determines the selection of research group personnel, and (8) members are influenced by how others perform their tasks. Items were scored on a zero or 1 basis and averaged for the group as a whole. The averaged group score thus represents the percentage of interdisciplinary characteristics attributed to the group by its members. The weighted average level of interdisciplinary characteristics was .71 out of a maximum of 1. The standard deviation was .08. The minimum characteristic score was .50, and the maximum score was .88. Thus in this sample no project was identified as meeting all of the defining characteristics. The projects varied from a low of 50 percent of the characteristics to a high of 88 percent of the defining characteristics.

Drawing on the work of Lawrence and Lorsch (1969), integration was measured by asking team members whether the relationship between each position was (1) sound—full unity of effort achieved, (2) almost full unity of effort, (3) somewhat better than average relations, (4) average—sound enough to get by even though there are many problems of achieving joint effort, (5) somewhat of a breakdown in relations, (6) almost complete breakdown in relations, (7) couldn't be worse—bad relations—serious problems exist that are not being solved, and (8) relations are not involved. Reversing the coding in the analysis, the weighted average level of integration was 5.03 out of a maximum of 7. The standard deviation was .94. A score of 5 indicated that the team had somewhat better than average integration.

### Dependent Variables

The following seven criterion variables were measured in 1977 and were used as output measures of long term research team performance: (1) research article quality, (2) quantity of published articles, (3) quantity of

**2**
**Goal Congruent Group Variables**
**39)**

| *LGPAP* | *LGTR* | *LGPAT* | *NSTU* | *I* | *C* | *CI* |
|---|---|---|---|---|---|---|
| 1.00 | | | | | | |
| .16 | 1.00 | | | | | |
| –.02 | –.01 | 1.00 | | | | |
| –.15 | –.07 | .36 | 1.00 | | | |
| –.24 | –.01 | –.22 | –.36 | 1.00 | | |
| .40 | .17 | .08 | .08 | –.17 | 1.00 | |
| .18 | .16 | –.06 | –.14 | .49 | .78 | 1.00 |

books published, (4) quantity of technical reports, (5) quantity of presented papers, (6) quantity of patents, and (7) the quantity of students graduated.

Research article quality was measured through the use of average project influence weight per year assigned to the journals in which project articles published through 1977 appeared. These influence weights were developed as size independent measures of the weighted number of citations a journal receives from other journals, normalized by the number of references the journal gives to other journals (Narin, 1976). The mean of the average influence weight per author for each group was .60 with a standard deviation of .32, indicating an influence within science for cross-disciplinary research approximately equal to that of clinical medicine (.59), greater than biology (.47), and considerably less than physics (2.10) or mathematics (2.98).

The quantity per year of articles, books, technical reports, papers, patents, and students was linearized by logarithmic transformations. Data on these variables were obtained through 1977 from averaging questionnaire responses substantiated, where possible, from documents. The median for the number of published articles in each group per year was 3.08. The median for the number of published books, technical reports, papers, and patents in each group per year was less than 1. The median for the number of students graduated in each group per year was 1.5.

## Method

Moderated regression analysis (Zedeck, 1971) was used to examine the relationship between each of the seven performance measures and the independent and interactive effects of interdisciplinary characteristics and integration. The intercorrelation matrix is presented in Table 2.

### TABLE 3
### Regression of the Quality of Articles (AQUAL) for Two Variables and Two Variables Plus Interaction

a. Results for Interdisciplinary Characteristics (C) and Integration (I)

$R^2 = .00296$ $F = .110$ $(df = 1,37)$

| Independent Variables | Multiple Correlation (R) | $R^2$ | Change in $R^2$ | $B_i$ | $t_i$ $(df=37)$ |
|---|---|---|---|---|---|
| $C = X_1$ | .05439 | .00296 | .00296 | .718 | .33 |
| $I = X_2$ | — | — | — | — | — |

$$\underset{(2.168)}{\text{AQUAL} = .718C} - \underset{(1.545)}{.53}$$

b. Results for Interdisciplinary Characteristics (C), Integration (I), and their Interaction (CI)

$R^2 = .02787$ $F = .334$ $(df = 3,35)$

| Independent Variables | Multiple Correlation (R) | $R^2$ | Change in $R^2$ | $B_i$ | $t_i$ $(df=35)$ |
|---|---|---|---|---|---|
| $C = X_1$ | .05439 | .00296 | .00296 | 28.565 | .326 |
| $I = X_2$ | .16693 | .02787 | .02409 | 3.666 | .931 |
| $CI = X_3$ | .06146 | .00378 | .00082 | −4.790 | .871 |

$$\text{AQUAL} = \underset{(29.608)}{28.565C} + \underset{(3.937)}{3.666I} - \underset{(5.074)}{4.790CI} - \underset{(23.008)}{21.863}$$

( ): Standard error of *B*
$^*p < .05$
$^{**}p < .01$

## RESULTS

As the results in Table 3 indicate, the largest contributor (*C*) only accounts for .00296 of the article quality (AQUAL) variance, an amount not significantly greater than zero ($F = .11, p > .05$). Addition of an interaction variable (*CI*) increases the explained variance from .00296 to .02787, an insignificant increase of .02491 ($t = .871, p > .05$). The explained variance in (AQUAL) by (*C*), (*I*), and (*CI*) does not differ significantly from zero ($F = .334, p > .05$). Therefore, the quality of published articles is not predictable from the interdisciplinary characteristics (*C*) of the group, from their level of integration (*I*), or their interaction (*CI*).

As indicated in Table 4, two variables together account for .25623 of the log of article quantity (LGART) variance with (*I*) accounting for the major contribution, because if it were dropped, $R^2$ would drop approximately .17, a highly significant amount ($t = 2.86, p < .01$). Addition of an interaction variable (*CI*) increases the explained variance from .25623 to .35296, an increase of .09673, a substantial and significant amount ($t = 2.287, p < .05$). Thus, an important conditional relationship exists in these data: the regression of the log of published articles (LGART) on

## TABLE 4

**Regression of the Log of Published Articles (LGART) for Two Variables and Two Variables Plus Interaction**[a]

a. Results for Interdisciplinary Characteristics (C) and Integration (I)

$R^2 = .25623$ $F = 6.20^{**}$ $(df = 2{,}36)$

| *Independent Variables* | *Multiple Correlation (R)* | $R^2$ | *Change in* $R^2$ | $B_i$ | $t_i$ $(df=36)$ |
|---|---|---|---|---|---|
| $C = X_1$ | .50619 | .25623 | .08711 | -2.090 | 2.05* |
| $I = X_2$ | .41124 | .16912 | .16912 | -.594 | 2.86** |

$$\underset{(1.018)}{\text{LGART} = -2.090\text{C}} - \underset{(.188)}{.594\text{I}} + \underset{(1.402)}{4.801}$$

b. Results for Interdisciplinary Characteristics (C), Integration (I), and their Interaction (CI)

$R^2 = .35296$ $F = 6.346^{**}$ $(df = 3{,}35)$

| *Independent Variables* | *Multiple Correlation (R)* | $R^2$ | *Change in* $R^2$ | $B_i$ | $t_i$ $(df=35)$ |
|---|---|---|---|---|---|
| $C = X_1$ | .59410 | .35296 | .11048 | -31.213 | 2.44* |
| $I = X_2$ | .49242 | .24248 | .05158 | -4.456 | 1.67 |
| $CI = X_3$ | .43692 | .19090 | .19090 | 5.005 | 2.287* |

$$\text{LGART} = -\underset{(12.768)}{31.213\text{C}} - \underset{(1.698)}{4.456\text{I}} + \underset{(2.188)}{5.005\text{CI}} + \underset{(9.92)}{27.29}$$

[a] Letting $C = .6239$, .7080, and .7921 results in equations:

Low (C = .6239): LGART = 7.82 − 1.34I
Average (C = .7080): LGART = 5.19 − .92I
High (C = .7921): LGART = 2.57 − .50I

( ): Standard error of *B*
$^{*}p < .05$
$^{**}p < .01$

interdisciplinary characteristics (*C*) varies with the level of achieved integration (*I*). When one substitutes a "low" score (1 sd below the mean), one for an "average" (*C*) score (at the mean), and one for a "high" (*C*) score (1 sd above the mean), low (*C*) cases show substantial (negative) linear regression of (LGART) on (*I*). As (*C*) increases, the slope of LGART on (*I*) becomes less steep but remains substantially negative. Thus, for example, increasing the interdisciplinary characteristics or integration of a group will decrease the quantity of articles published. A research project with few interdisciplinary characteristics could be more highly integrated and achieve increased article production. Alternatively, a project with many interdisciplinary characteristics could increase its article production by reducing the level of integration. For these data, $B_2 = -4.456$ is not significant ($t = 1.67$, $p > .05$), leading to the conclusion that the differential slope of (LGART) on (*I*) is not materially dependent on (*I*) as such, but rather on (*CI*) (i.e., $B_3 = 5.005$, $t = 2.287$, $p < .05$). That is, the change in the relationship between article quantity (LGART) and integration (*I*) is not due so much to the effect of integration (*I*) as to the interaction between groups with interdisciplinary characteristics (*C*) and integration (*I*).

## TABLE 5
## Regression of the Log of Books Published (LGBK) for Two Variables and Two Variables Plus Interaction

a. Results for Interdisciplinary Characteristics (C) and Integration (I)

$R^2=.10886$ $F=2.199$ $(df=2,36)$

| Independent Variables | Multiple Correlation (R) | $R^2$ | Change in $R^2$ | $B_i$ | $t_i\ (df=36)$ |
|---|---|---|---|---|---|
| $C=X_1$ | .32009 | .10246 | .10246 | -1.204 | 2.03* |
| $I=X_2$ | .32994 | .10886 | .00640 | .059 | .51 |

$$\underset{}{\mathrm{LGBK}} = \underset{(.627)}{-1.204C} + \underset{(.116)}{.059I} + \underset{(.863)}{.106}$$

b. Results for Interdisciplinary Characteristics (C), Integration (I), and their Interaction (CI)

$R^2=.11551$ $F=1.524$ $(df=3,35)$

| Independent Variables | Multiple Correlation (R) | $R^2$ | Change in $R^2$ | $B_i$ | $t_i\ (df=35)$ |
|---|---|---|---|---|---|
| $C=X_1$ | .32009 | .10246 | .10246 | -5.499 | 2.01 |
| $I=X_2$ | .33987 | .11551 | .00529 | -.511 | .46 |
| $CI=X_3$ | .33199 | .11022 | .00665 | .738 | .28 |

$$\mathrm{LGBK} = \underset{(8.397)}{-5.499C} - \underset{(1.117)}{.511I} + \underset{(1.439)}{.738CI} + \underset{(6.525)}{3.423}$$

( ): Standard error of *B*
$^*p<.05$
$^{**}p<.01$

As the results in Table 5 indicate, the two variables together account for .10886 of the log of book quantity (LGBK) variance with (*C*) accounting for the major contribution, because if it were dropped $R^2$ would drop approximately .10, a significant amount ($t=2.03$, $p<.05$). Addition of an interaction variable (*CI*) increases the explained variance from .10886 to .11551, an increase of .00665, an insignificant amount ($t=.28$, $p>.05$). Thus, no significant conditional relationship exists in these data: the amount of variance explained in (LGBK) by (*C*), (*I*), and (*CI*) does not differ significantly from zero ($F=1.524$, $p>.05$, $df=35$). Therefore, the number of books produced is not predictable from the interdisciplinary characteristics (*C*) of the group, from their level of integration (*I*), or their interaction (*CI*).

The results in Table 6 indicate that the two variables together account for .18655 of the log of papers (LGPAP) variance, an amount significantly greater than zero ($F=4.128$, $p<.05$), with (*C*) accounting for the major contribution, because if it were dropped, $R^2$ would drop by approximately .16, a significant amount ($t=2.64$, $p<.05$). Addition of an interaction variable (*CI*) increases the explained variance from .18655 to .26303, an increase of .07648, an insignificant amount ($t=1.906$, $p>.05$). Thus, no

## TABLE 6
## Regression of the Log of Papers Produced (LGPAP) for Two Variables and Two Variables Plus Interaction

a. Results for Interdisciplinary Characteristics (C) and Integration (I)

$R^2 = .18655$  $F = 4.128^*$  $(df = 2,36)$

| *Independent Variables* | *Multiple Correlation (R)* | $R^2$ | *Change in* $R^2$ | $B_i$ | $t_i\ (df=36)$ |
|---|---|---|---|---|---|
| $C = X_1$ | .39645 | .15725 | .15725 | 1.798 | 2.64* |
| $I = X_2$ | .43191 | .18655 | .02930 | −.157 | 1.14 |

LGPAP = 1.798C − .157I − .752
(.746) (.138) (1.03)

b. Results for Interdisciplinary Characteristics (C), Integration (I), and their Interaction (CI)

$R^2 = .26303$  $F = 4.164$  $(df = 3,35)$

| *Independent Variables* | *Multiple Correlation (R)* | $R^2$ | *Change in* $R^2$ | $B_i$ | $t_i\ (df=35)$ |
|---|---|---|---|---|---|
| $C = X_1$ | .39654 | .15725 | .15725 | 19.947 | 2.73** |
| $I = X_2$ | .51287 | .26303 | .06612 | 2.250 | 1.77 |
| $CI = X_3$ | .44375 | .19691 | .03967 | −3.119 | 1.906 |

LGPAP = 19.947C + 2.250I − 3.119CI − 14.770
(9.55) (1.270) (1.637) (7.421)

( ): Standard error of *B*
$^*p < .05$
$^{**}p < .01$

significant conditional relationship exists in these data: the best predictor of the number of papers is the extent of interdisciplinary characteristics (*C*) in the group. The relationship between (LGPAP) and (*C*) is positive; therefore, the more interdisciplinary characteristics (*C*), the greater the number of papers produced.

As the findings in Table 7 indicate, the largest contributor (*C*) accounts for only .03057 of the log of technical reports (LGTR) variance, an amount not significantly greater than zero ($F = 1.167$, $p > .05$). Addition of an interaction variable (*CI*) increases the explained variance from .03057 to .08566, an insignificant increase of .05509 ($t = 1.45$, $p > .05$). The explained variance in (LGTR) by (*C*), (*I*), and (*CI*) does not differ significantly from zero ($F = 1.093$, $p > .05$). Therefore, the quantity of technical reports is not predictable from the interdisciplinary characteristics (*C*) of the group, from their level of integration (*I*), or their interaction (*CI*).

As indicated by the results in Table 8, the two variables together account for .05216 of the log of patents (LGPAT) variance, with (*I*) accounting for the major contribution, because if it were dropped, $R^2$ would drop approximately .05. Addition of an interaction variable (*CI*) increases the explained variance from .05216 to .07657, an increase of only .02441,

TABLE 7
**Regression of the Log of Technical Reports (LGTR) for Two Variables and Two Variables Plus Interaction**

a. Results for Interdisciplinary Characteristics (C) and Integration (I)
$R^2 = .03057$ $F = 1.167$ $(df = 1,37)$

| *Independent Variables* | *Multiple Correlation (R)* | $R^2$ | *Change in* $R^2$ | $B_i$ | $t_i$ $(df=37)$ |
|---|---|---|---|---|---|
| $C = X_1$ | .17484 | .03057 | .03057 | .327 | 1.08 |
| $I = X_2$ | — | — | — | — | — |

LGTR = .327C − .559
(.302) (.216)

b. Results for Interdisciplinary Characteristics (C), Integration (I), and their Interaction (CI)
$R^2 = .08566$ $F = 1.093$ $(df = 3,35)$

| *Independent Variables* | *Multiple Correlation (R)* | $R^2$ | *Change in* $R^2$ | $B_i$ | $t_i$ $(df=35)$ |
|---|---|---|---|---|---|
| $C = X_1$ | .17484 | .03057 | .03057 | −5.536 | 1.08 |
| $I = X_2$ | .29267 | .08566 | .05347 | −.773 | 1.43 |
| $CI = X_3$ | .17940 | .03219 | .00162 | 1.008 | 1.45 |

LGTR = −5.536C − .7731 + 1.008CI + 3.937
(4.061) (.540) (.696) (3.156)

( ): Standard error of *B*
$^*p < .05$
$^{**}p < .01$

an insignificant amount ($t = .962$, $p > .05$). Thus, no significant conditional relationship exists in these data: the amount of variance explained in (LGPAT) by (*C*), (*I*), and (*CI*) does not differ significantly from zero ($F = .967$, $p > .05$). Therefore, the number of patents produced is not predictable from the interdisciplinary characteristics (*C*) of the group, from their level of integration (*I*), or their interaction (*CI*).

As the findings in Table 9 indicate, the two variables together account for .13003 of the log of students graduating (NSTU) variance, with (*I*) accounting for the major contribution. If it were dropped, $R^2$ would drop approximately .13, a highly significant amount materially as well as statistically ($t = 2.32$, $p < .05$). Addition of an interaction variable (*CI*) increases the explained variance from .13003 to .22353, an increase of .0935, a substantial and significant amount ($t = 2.05$, $p < .05$). Thus, an important conditional relationship exists in these data: the regression of the number of students graduating (NSTU) on interdisciplinary characteristics (*C*) varies with the level of achieved integration (*I*). When one substitutes a "low" (*C*) score (1 sd below the mean), one for an "average" (*C*) score (at the mean), and one for a "high" (*C*) score (1 sd above the mean), low (*C*) cases show substantial (negative) linear regression of (NSTU) on (*I*).

## TABLE 8
## Regression of the Log of Patents (LGPAT) for Two Variables and Two Variables Plus Interaction

a. Results for Interdisciplinary Characteristics (C) and Integration (I)

$R^2 = .05216$ $F = .991$ $(df = 2,36)$

| *Independent Variables* | *Multiple Correlation (R)* | $R^2$ | *Change in* $R^2$ | $B_i$ | $t_i\ (df=36)$ |
|---|---|---|---|---|---|
| $C = X_1$ | .22839 | .05216 | .00158 | .421 | .24 |
| $I = X_2$ | .22491 | .05058 | .05058 | .420 | 1.39 |

$$\text{LGPAT} = \underset{(1.718)}{.421C} - \underset{(.317)}{.420I} + \underset{(2.366)}{2.007}$$

b. Results for Interdisciplinary Characteristics (C), Integration (I), and their Interaction (CI)

$R^2 = .07657$ $F = .967$ $(df = 3,35)$

| *Independent Variables* | *Multiple Correlation (R)* | $R^2$ | *Change in* $R^2$ | $B_i$ | $t_i\ (df=35)$ |
|---|---|---|---|---|---|
| $C = X_1$ | .27671 | .07657 | .02334 | -21.453 | .94 |
| $I = X_2$ | .22491 | .05058 | .05058 | -3.321 | 1.38 |
| $CI = X_3$ | .23071 | .05323 | .00264 | 3.759 | .962 |

$$\text{LGPAT} = \underset{(22.807)}{-21.453C} - \underset{(3.033)}{3.321I} + \underset{(3.908)}{3.759CI} + \underset{(17.724)}{18.901}$$

( ): Standard error of *B*
$^{*}p < .05$
$^{**}p < .01$

As (*C*) increases, the slope of (NSTU) on (*I*) becomes less steep but remains substantially negative. That is, increasing the interdisciplinary characteristics (*C*) of a group will decrease the number of students graduated, as will increasing the level of integration (*I*) because (*C*) and (*I*) are symmetrical. Because all three independent variables are significant, the relationship between number of students graduated (NSTU) and interdisciplinary characteristics (*C*), and integration (*I*) depends upon (*C*), (*I*), and their interaction (*CI*). Thus, increasing the interdisciplinary characteristics and integration leads to a reduction in students graduated. All of these results are summarized in Table 10.

## CONCLUSIONS

This study has sought to examine the emphasis on integrating specialized experts from different disciplines in academic research projects in light of the view of universities as loosely coupled organized anarchies. The results support the central research hypothesis that: if academic research groups agree on the importance of research outputs as organizational goals, then higher performing groups will have fewer

## TABLE 9
## Regression of the Log of Student Graduations (NSTU) for Two Variables and Two Variables Plus Interaction[a]

a. Results for Interdisciplinary Characteristics (C) and Integration (I)

$R^2=.13003$ $F=2.690$ $(df=2,36)$

| *Independent Variables* | *Multiple Correlation (R)* | $R^2$ | *Change in* $R^2$ | $B_i$ | $t_i$ *(df=36)* |
|---|---|---|---|---|---|
| $C=X_1$ | .36059 | .13003 | .00040 | .176 | .13 |
| $I=X_2$ | .36003 | .12962 | .12962 | -.569 | 2.32* |

$$NSTU=.176C-.569I+2.715$$
$$(1.364)\quad(.251)\quad(1.878)$$

b. Results for Interdisciplinary Characteristics (C), Integration (I), and their Interaction (CI)

$R^2=.22353$ $F=3.359^*$ $(df=3,35)$

| *Independent Variables* | *Multiple Correlation (R)* | $R^2$ | *Change in* $R^2$ | $B_i$ | $t_i$ *(df=35)* |
|---|---|---|---|---|---|
| $C=X_1$ | .47279 | .22353 | .09206 | -35.295 | 2.04* |
| $I=X_2$ | .36003 | .12962 | .12962 | -5.273 | 2.42* |
| $CI=X_3$ | .36259 | .13147 | .00185 | 6.096 | 2.05* |

$$NSTU=-35.295C-5.273I+6.096CI+30.110$$
$$(17.326)\quad(2.304)\quad(2.969)\quad(13.464)$$

[a] Letting $C=.6239$, $.7080$, and $.7921$ results in equations:

Low (C=.6239): $NSTU=8.09-1.47I$
Average (C=.7080): $NSTU=5.12-.96I$
High (C=.7921): $NSTU=2.15-.44I$

( ): Standard error of $B$
$^*p<.05$
$^{**}p<.01$

interdisciplinary characteristics and will be less integrated. The findings indicate that increasing the interdisciplinary characteristics or integration of research teams results in decreases in published articles and students graduated, as predicted. Integrating cross-disciplinary research efforts apparently leads to increased difficulty in publishing articles. Editors may find it difficult to obtain adequate peer reviews of such research and may be reluctant to devote valuable page space to research that they are unable to evaluate properly or that goes beyond the boundaries of their specialized readership market. A pertinent question for further research would be whether disciplines at more advanced stages of paradigm development are more resistant to publishing interdisciplinary research findings.

Interdisciplinary graduate training, while growing, did not provide readily marketable graduates for the scientific marketplace. Students may have recognized that their career opportunities would be advanced further if they worked on projects that could be translated more easily into issues of interest to their own discipline rather than working on highly integrated cross-disciplinary research efforts. Variations in article quality and the quantity of books, technical reports, and patents are not significantly

## TABLE 10
## Summary of Results
## (Standardized Regression Coefficients)

| *Independent Variables* | *Dependent Variables*[a] | | | | | | |
|---|---|---|---|---|---|---|---|
| | *AQUAL* | *LGART* | *LGBK* | *LGPAP* | *LGTR* | *LGPAT* | *NSTU* |
| (C) Interdisciplinary characteristics | 2.16288 | -4.47108 | -1.40032 | 4.07699 | -2.96352 | -2.05523 | -4.08143 |
| (I) Integration | 1.50559 | -3.46183 | -.70555 | 2.49440 | -2.24313 | -1.72536 | -3.30676 |
| (CI) Interaction | -2.38965 | 4.72332 | 1.23846 | -4.20004 | 3.55639 | 2.37265 | 4.64410 |
| $R^2$ Before interaction | .00296 | .25623 | .10886 | .18655 | .03057 | .05216 | .13003 |
| $R^2$ With interaction | .02787 | .35296 | .11551 | .26303 | .08566 | .07657 | .22353 |
| $R^2$ Difference | .02491 | .09673* | .00665 | .07648 | .05509 | .02444 | .09350** |

[a] AQUAL = Article quality; LGART = Log of article quantity; LGBK = Log of book quantity; LGPAP = Log of paper quantity; LGTR = Log of technical report quantity; LGPAT = Log of patent quality; NSTU = Log of students graduating.

*$p < .05$, two-tailed *F*-test

**$p < .01$, two-tailed *F*-test

explained by either interdisciplinary characteristics or integration. These research outputs would be less likely to be affected by narrowly specialized markets. Only variation in the number of papers produced was positively associated and significantly explained by interdisciplinary characteristics (but not integration).

These findings present evidence in support of loosely coupling cross-disciplinary researchers rather than attempting to integrate tightly their efforts if research outputs of the type measured here are to be the criteria for evaluating performance. It remains to be investigated whether solutions to client problems that do not result in research publications or students' graduation are better achieved through tightly integrated or more loosely coupled relationships and whether integrated effort is more appropriate for certain stages of the research process than others.

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# *Community Size, Socialization, and the Work Needs of Professionals*[1]

**SEYMOUR ADLER**
**NISSIM ARANYA**
**Tel-Aviv University**
**JOEL AMERNIC**
**University of Toronto**

*This study tested whether the community size of early socialization directly affects adult work needs among professionals. The size of the community in which early socialization occurred generally had no significant effects on adult work needs. These results are consistent with previous findings on nonprofessionals.*

Although it is clear that processes of adult socialization have an important effect on work motives (Becker, 1970; Inkeles & Smith, 1974; Mortimer & Simmons, 1978; Schein, 1978), there is evidence that these motives begin to develop in childhood and are affected by familial, cultural, and psychological variables.

Borow (1966) concluded, after reviewing the relevant literature, that early childhood experiences affect career choice and subsequent career behavior. Goldthorpe, Lockwood, Bechhofer, and Platt (1968) have indicated that the type of work orientation people develop in youth affects the type of organizational career they select for themselves. In his classical study on the stability of vocational interests, Strong (1951) found that the vocational interests of a group of 15-year olds were remarkably consistent with their vocational interests when retested 22 years later. Similarly, Kelly (1955) found that almost 50 percent of the variance on tests of vocational interests and values taken in middle age was predicted by scores obtained from the subjects 20 years earlier.

One of the structural variables that has been proposed as relevant to the early socialization of work motives is the size of the community in which

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an individual is brought up. Classical sociological theory and research stressed the differences between urban and rural ways of life and the effects of these differences on the socialization of values and motives (Sorokin, Zimmerman, & Galpin, 1930; Wirth, 1938). The general argument has been that rural norms place greater stress on "intrinsic values" and less on materialistic concerns than do urban norms. Lockwood (1960) claimed, for example, that in communities that are less cohesive and stable, such as urban communities, people are more likely to learn the consumerist values popularized by the media and hence develop an instrumental orientation toward work. Ingham (1970) used a similar analysis in describing the development of "economism" among the working class.

One of the clearest arguments for urban-rural differences in work motives has been made by Hulin and Blood (1968). They argue that workers with rural backgrounds are more likely to accept middle class norms concerning the intrinsic value of work but those with urban backgrounds are more likely to be alienated from these middle class norms. As a result of their greater acceptance of intrinsic work values, rural workers are expected to be more positive than urban workers in their attitudes toward enriched jobs.

However, the studies that have looked at the effect of urban-rural place of early socialization have consistently failed to support Hulin and Blood's theory. Shepard (1970) found that the relationship between functional specialization and job satisfaction was not affected by whether the worker had an urban or rural upbringing. Wanous (1974) reported that urban-rural upbringing failed to moderate correlations between job scope and job attitude in 15 of 16 comparisons for a sample of female telephone operators. Stone (1976) also found that urban-rural socialization had no moderating impact whatsoever on correlations between job scope and satisfaction with the work itself. Finally, Castellano (1976) failed to find a relation between urban-rural socialization and the job satisfaction of printing plant employees even when controlling for job level.

None of these studies, however, directly addressed whether the size of the community of early socialization has an effect on the intrinsic work needs of adults. The earlier studies using urban-rural background as a moderator of various relations may have failed to find support for the predictions of Hulin and Blood because of factors other than work need differences alone. For example, there was no control for differences in the jobs and the organizational environments for those of rural and urban backgrounds in the studies of Shepard and Stone, and these differences may have been confounded with work need differences. Even in the Wanous study, although all employees were in similar jobs in the same organization, there still was no direct test of urban-rural differences in work needs.

The current study proposes to study directly the effects of the size of the community in which someone was raised on the person's intrinsic work needs. Consistent with Hulin and Blood's theory, *it is hypothesized that* *those brought up in more rural areas will show stronger higher-order work needs as adults than will those raised in more urban communities.* The present study attempts to test for these urban-rural differences on a single occupational group, professional accountants, thus attempting to hold constant some of the relevant job and educational variables.

## METHOD

### Subjects

The sample consisted of 2,590 Chartered Accountants selected randomly from all over Canada and representing 10 percent of the population of English speaking, Canadian Chartered Accountants. Chartered Accountants in Canada are parallel to Certified Public Accountants in the United States. Generally, to be chartered, an accountant must have a B.A. degree in accounting, at least three years experience, and pass a licensing examination administered by the Canadian Institute of Chartered Accountants. Accountants who are chartered are licensed to express opinions on financial statements as external auditors.

Subjects were sent a mailed questionnaire. A pretest mailing to 100 Chartered Accountants from Ontario yielded a 48 percent response rate. For the entire sample, 1,206 replies were received, yielding a 46.6 percent response rate. Of the sample, 97.4 percent were male and the average age of respondents was 38 years. The possibility exists that the response rate of less than 50 percent obtained here resulted in a biased sample as regards the variables of interest. It should be noted, however, that the sample's distributions for field of specialization, occupational setting, and organizational level are almost identical with those of the population of Canadian Chartered Accountants as a whole as provided in the 1977-1978 annual report of the Canadian Institute of Chartered Accountants. At least as far as these criteria are concerned, then, the final sample appears to be representative.

### Measures

The following measures relevant to the study were included in a larger questionnaire that was mailed to the sample.

*Community Size of Socialization*—In order to obtain a more sensitive measure of community size than the simple urban-rural dichotomy usually used, six categories of community size were employed in the present study. The relevant question read:

> What was the size of the community in which you spent the largest portion of your life up to the time you were sixteen years old?
> 1. On a farm or ranch
> 2. In a rural area (not on a farm or ranch)
> 3. A suburban town near a city

4. A small city (less than 100,000 people)
5. Average city (from 100,000 to 500,000)
6. Large city (more than 500,000)

*Work Needs*—Porter's Need Satisfaction Questionnaire (Porter, 1961) was included in the larger questionnaire subjects received. As used here, the questionnaire consisted of 12 work characteristics (of the original 13 appearing in Porter's instrument) that fall into the following need categories: security, social, esteem, autonomy, and self-actualization. For each work characteristic, the subject indicated on a 7-point scale:

a. How much is there now (in present job)?
b. How much should there be?
c. How important is this (work characteristic) to me?

Using these items, work need strength was measured in two different ways for each need category. One method involved averaging the ratings regarding "how much should there be" across items tapping the need category. The other measure involved averaging "how important is this" ratings across items in each need category.

The means, standard deviations, and reliabilities (coefficient alpha) of the need scales, as well as the number of items in each scale, are included in Table 1. Despite the small number of items in each scale, almost all had internal consistency reliability coefficients in the acceptable range. Because the Need Satisfaction Questionnaire uses only one item to measure security needs, no reliability is reported. Although the Porter instrument gives particular emphasis to the higher-order needs (Wahba & Bridwell, 1976), this was not seen as a particular disadvantage in the present study. The literature on urban-rural differences reviewed above focuses on higher-order needs, and these needs were presumed to be most related to the professionals studied here.

The zero-order correlation among all the work need measures are presented in Table 2. As Wahba and Bridwell (1976) have noted, the need categories on Porter's measure tend to be significantly correlated with one

**TABLE 1**
**Means, Standard Deviation, Number of Items, and Reliability Coefficients ($N = 1,145$)**

| *Scale* | *M* | *SD* | *Items* | *Alpha* |
|---|---|---|---|---|
| *Need strength: How much should there be?* | | | | |
| Self-actualization | 6.02 | .80 | 3 | .77 |
| Autonomy | 5.82 | .82 | 3 | .70 |
| Esteem | 5.72 | .89 | 3 | .68 |
| Social | 5.28 | 1.05 | 2 | .54 |
| Security | 5.67 | 1.22 | 1 | — |
| *Need strength: How important?* | | | | |
| Self-actualization | 6.05 | .81 | 3 | .73 |
| Autonomy | 5.69 | .91 | 3 | .63 |
| Esteem | 5.71 | .95 | 3 | .65 |
| Social | 5.13 | 1.17 | 2 | .48 |
| Security | 5.42 | 1.43 | 1 | — |

## TABLE 2
## Intercorrelations of Work Need Strength Scores[a]

| | *How much should there be?* | | | | | *How important?* | | | |
|---|---|---|---|---|---|---|---|---|---|
| | *Self-act* | *Aut* | *Est* | *Soc* | *Sec* | *Self-act* | *Aut* | *Est* | *Soc* |
| *How much should there be?* | | | | | | | | | |
| Autonomy | .72[b] | | | | | | | | |
| Esteem | .81 | .70 | | | | | | | |
| Social | .59 | .55 | .53 | | | | | | |
| Security | .37 | .36 | .38 | .31 | | | | | |
| *How important?* | | | | | | | | | |
| Self-actualization | .78 | .57 | .66 | .48 | .24 | | | | |
| Autonomy | .59 | .81 | .60 | .46 | .27 | .67 | | | |
| Esteem | .57 | .49 | .73 | .42 | .27 | .75 | .62 | | |
| Social | .45 | .43 | .42 | .80 | .26 | .49 | .46 | .44 | |
| Security | .25 | .24 | .28 | .23 | .62 | .26 | .26 | .31 | .26 |

[a] *N*s vary from 1,196 to 1,206.

[b] All correlations significant at .01 level.

another. As a result, it was necessary to use multivariate analysis of variance in the present study. Furthermore, the two methods used to measure need strength also were highly intercorrelated (with *r*'s ranging from .62 to .81). The test of the hypothesis on "how important" measures was thus seen as a nonorthogonal replication of the analysis on the "how much should there be" measures, and the results were not expected to differ.

*Social Desirability*—The Crowne and Marlowe social desirability scale (Crowne & Marlowe, 1964) was used to assess the extent to which responses on the measures used in the study were subject to social desirability response bias. The social desirability scale was correlated with all the measures reported in this study. The coefficients were generally low, ranging from .03 to .15. On the whole, it was concluded that social desirability had little meaningful impact on the measures used in the present study.

## RESULTS

The major hypothesis of the present study was that people socialized in communities of varying size would show significant differences as adults in their work needs: those from more rural background would show greater higher-order need strength and less lower-order need strength than those of more urban backgrounds. Table 3 presents the mean need strength score using the "how much should there be" and "how important" ratings for the five need categories across the six community sizes.

Multivariate analysis of variance was performed on the "how much should there be" scores. The results were nonsignificant, $F(25, 5935) < 1.0$. The results were similarly nonsignificant for the multivariate analysis of the "how important" scores, $F(25, 5940) < 1.0$. As a result, no further univariate analyses were performed for the individual dependent variables. Inspection of the means in Table 3 fails to reveal any consistent trends in the predicted direction.

**TABLE 3**
**Mean Work Need Strength as a Function of Community Size for Two Measures of Need Strength**

| | *Community Size* | | | | | |
|---|---|---|---|---|---|---|
| *Need Strength* | *Farm or Ranch (n=109)* | *Other Rural Area (n=162)* | *Suburban Town (n=125)* | *Small City (n=243)* | *Average City (n=195)* | *Large City (n=359)* |
| *How much should there be?* | | | | | | |
| Self-actualization | 6.01 | 6.00 | 5.98 | 6.01 | 6.04 | 6.07 |
| Autonomy | 5.80 | 5.80 | 5.80 | 5.79 | 5.82 | 5.86 |
| Esteem | 5.62 | 5.72 | 5.64 | 5.63 | 5.59 | 5.68 |
| Social | 5.22 | 5.36 | 5.34 | 5.28 | 5.26 | 5.27 |
| Security | 5.75 | 5.66 | 5.66 | 5.80 | 5.56 | 5.63 |
| *How important?* | | | | | | |
| Self-actualization | 6.03 | 6.09 | 5.97 | 6.06 | 6.03 | 6.10 |
| Autonomy | 5.77 | 5.65 | 5.64 | 5.66 | 5.66 | 5.73 |
| Esteem | 5.23 | 5.32 | 5.29 | 5.29 | 5.28 | 5.37 |
| Social | 5.15 | 5.24 | 5.11 | 5.17 | 5.10 | 5.08 |
| Security | 5.60 | 5.42 | 5.30 | 5.52 | 5.31 | 5.39 |

## DISCUSSION

The results of this study on professional accountants, then, are consistent with earlier tests of the Hulin and Blood hypothesis: community size of early socialization is not an important influence on adult work needs. There may really be no differences between urban and rural environments in the critical factors that influence the socialization of work motivation. Perhaps the traditional differences between urban and rural culture described in the classical sociological and anthropological literature (Sorokin et al., 1930; Wirth, 1938) may be less true today, particularly in modern Western countries such as Canada (Form, 1971; Wirth, 1969). Fuller, cited by Form (1971), for example, has argued that due to the mass media that is centered in urban society, urban culture has permeated the open country and wiped out its traditional character. Form (1971) noted this phenomenon as well and used it to explain the similarity found by Blau and Duncan (1967) between American workers from urban versus rural backgrounds. As Wirth noted,

> The difficulties that stand in the way of a rigorous comparison of rural and urban modes of life and problems are many, nowhere more numerous than in the United States and the countries of the Western world where the fusion of the two is becoming an inescapable fact...The standardization of ways of living tends to make rural life as we have known it look archaic in many respects: we look upon it more and more as a survival from an earlier era (1969, pp. 165-166).

The results of the current study on Canadian accountants may reflect this breakdown of differences between urban and rural culture.

It may also be possible, however, that relevant early socialization influences stemming from community size do exist but that they are offset by later socialization influences on work need development. This conclusion would be consistent with a body of theory and research supporting the primacy of socialization processes that occur after childhood in determining work-related values and needs (Becker, 1970; Brim, 1968; Inkeles &

Smith, 1974; Mortimer & Simmons, 1978). Suggestive support for this argument also comes from literature related to Hulin and Blood's theory. Studies most consistently supportive of this theory are those that have looked at urban-rural differences in the location of the workplace. For example, Turner and Lawrence (1965) and Blood and Hulin (1967) found that those working in factories located in rural areas reacted more favorably to enlarged jobs than did those in urban factories. Similar results were reported by Hackman and Lawler (1971) for telephone company employees working in urban and rural settings.

One would expect the importance of late socialization processes to be particularly salient for professionals, such as the accountants in the present sample, who undergo intensive formal and informal socialization experiences during their training and early career stages (Becker, Greer, Hughes, & Strauss, 1961; Merton, Reader, & Kendall, 1957; Ondrak, 1975; Van Maanen, 1976, 1977). Thus, any differences in early socialization relating to the size of the community in which an accountant was reared in his or her early years might be more than offset by these powerful agents of late socialization.

If the results of this research on professionals are placed alongside the research previously cited on urban-rural differences, it is clear that future efforts would be better invested in studying mechanisms of work-need socialization, early or late, rather than structural determinants.

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# *Generalizability of an Organizational Commitment Model*[1]

**JAMES H. MORRIS**
**University of Santa Clara**
**J. DANIEL SHERMAN**
**University of Alabama**

*A multivariate predictive model of organizational commitment explained a highly significant proportion of the variation in commitment within a combined heterogeneous sample. Subsequent analyses of the model's generalizability indicated that certain nuisance variables did not significantly change the functional structure of the model or alter its ability to predict levels of commitment.*

A growing body of research indicates that organizational commitment (Porter & Smith, 1970) has utility as a predictor of such important behavioral outcomes as performance (Mowday, Porter, & Dubin, 1974), absenteeism (Steers, 1977) and turnover (Hom, Katerberg, & Hulin, 1979; Porter, Crampon, & Smith, 1976; Porter, Steers, Mowday, & Boulian, 1974). And, in view of the potential importance of commitment to the etiology of organizational behavior, it is not surprising that much effort has been directed toward identifying variables that may influence levels of commitment (Brown, 1969; Buchanan, 1974; Hall & Schneider, 1972; Hrebiniak & Alutto, 1972; Lee, 1971; Steers, 1977; Stevens, Beyer, & Trice, 1978).

Although a great deal has been learned about potential influences on organizational commitment from these studies, no single, widely accepted set of commitment antecedents has emerged to endure repeated testing. At least three factors may have accounted for this. Until recently, few studies have used multivariate analytical techniques to identify potential determinants of commitment. Consequently, a wide variety of variables has been

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shown to obtain significant bivariate correlations with commitment. However, because many of these variables have not been tested competitively (i.e., for incremental predictive utility), it has been difficult to render parsimonious models from a synthesis of the literature. In addition, even with the appearance of multivariate modeling, organizational commitment studies have not, in general, linked their respective empirical results to a common, theoretically-grounded framework from which predictor variables were derived. See Steers (1977) and Stevens et al. (1978) for exceptions. Finally, several definitions and measures of the commitment concept have been developed and used in different studies.

Lacking, then, is a body of independent studies that relies on a common theoretical framework to select antecedent variables and then build multivariate predictive models of a particular measure of organizational commitment. At present, the two most comparable multivariate studies of organizational commitment are those of Steers (1977) and Stevens et al. (1978). Both of these studies used Steers' (1977) theoretical framework of commitment influences to guide in their respective selection of antecedent variables, but each used different measures of commitment to serve as the dependent variable. Given the dissimilarity of their results with respect to levels of variation explained in commitment, a central issue becomes that of the differences in concepts (and thus measures) of organizational commitment that exist among researchers.

## ORGANIZATIONAL COMMITMENT

### Measures

Stevens et al. (1978) have suggested that the different conceptions of organizational commitment can be subsumed in two categories, exchange approaches and psychological approaches. Exchange approaches view commitment as an outcome of inducement/contribution transactions between the organization and member, with an explicit emphasis on the instrumentalities of membership as the primary determinant of the member's accrual of advantage or disadvantage in the ongoing process of exchange. Under this approach, the greater the favorability of the exchange from the member's perspective, the greater will be his or her commitment to the organization. As Stevens et al. have pointed out, this conceptualization is consistent with Becker's (1960) argument that attachments to the organization are influenced strongly by "side bets," accrued extrinsic benefits that would be lost if membership was terminated.

From the standpoint of predicting ongoing behavior in organizations, at least two limitations seem evident at the present time with measures of commitment that have been derived from the exchange approach. First, this approach has generated measures of commitment that dimensionalize the concept as an orientation toward the organization that is predicated almost entirely on utilitarian considerations. Accordingly, the exchange perspective assumptions have yielded measures that tap particular instrumentalities that Etzioni (1961) identifies with "calculative involvements" and a "low intensity" orientation toward the organization. Therefore, to the extent that side bets or other tenure-based accrual phenomena are seen as the principal determinants of commitment levels, one is led to measures of commitment that may reflect the degree to which the member is hesitant to leave the organization for employment elsewhere (i.e., organizational attachment or propensity to leave) but little else with respect to ongoing behavioral predispositions *within* the given employment relationship. It is consistent with this argument that measures developed under this approach have indexed commitment exclusively as the likelihood that respondents would leave the organization if certain inducements were available in other employment settings. Thus, although such measures may provide good information about a member's propensity to leave the organization, it is difficult to suppose, a priori, that other, ongoing behaviors would be predicted as well.

A second limitation of exchange-based measures of commitment stems from the lack of empirical evidence that they are, in fact, related to particular ongoing behavioral outcomes within the organization. To date, all studies that have used exchange-based measures have focused on their antecedents or attitudinal outcomes (Hrebiniak & Alutto, 1972; Stevens et al., 1978).

In contrast to the exchange-based conception of commitment, the psychological approach as originally conceived by Porter and Smith (1970) describes commitment as a more active and positive orientation toward the organization. For example, Sheldon defined commitment as "an attitude or an orientation toward the organization which links or attaches the identity of the person to the organization" (1971, p. 143). Buchanan (1974) viewed it as a three-component orientation consisting of identification with the goals and values of the organization, high involvement in work activities, and a loyal attachment to the organization. Similarly, Porter et al. (1974) saw commitment to involve an internalization of the organization's values, a willingness to focus strong effort toward helping the organization achieve its goals, and a strong desire to maintain membership in the organization. Together, these psychological approaches to commitment depict a decidedly positive, high-intensity orientation toward the organization. In addition, they include, but go beyond, the hesitancy-to-leave component that has been the fundamental dimension represented in exchange-based measures of organizational commitment.

To date, all empirical studies that have shown organizational commitment to be related to ongoing behavioral outcomes have used Porter's measure of commitment (Porter et al., 1974) which is based on the so-called psychological approach described in Porter and Smith (1970). Additionally, in contrast to other measures, Porter's index has a substantial body of reliability and validity documentation (see Mowday, Steers, & Porter, 1979). Therefore, Porter's measure was selected for use in the present study.

### Antecedents

In spite of the growing evidence that this measure of organizational commitment is related to important behavioral outcomes, several questions remain about its antecedents. Among the more important questions are those concerning the external validity or generalizability of multivariate models that are used to predict commitment levels. For example, recent evidence has indicated that some attitudes toward work may depend on the organization level and/or nature of the job held by the organization member (Adams, Laker, & Hulin, 1977; Herman & Hulin, 1972; Stone & Porter, 1975). As yet, however, no multivariate studies have examined directly whether a given model of organizational commitment may be sensitive to job and level differences represented in respondent samples. In addition, information concerning the generalizability of commitment models across different organizations is not well documented in the literature.

In summary, information is lacking about the generalizability of multivariate commitment models. To the extent that given multivariate models of commitment exhibit significant changes across job or organizational settings, the utility of the underlying theory becomes weakened. Thus, although previously cited evidence does suggest that commitment is related to important outcomes in organizations, less information is presently available for managers who may wish to focus their attention on antecedent variables that are related to commitment. Before managers can hope to influence commitment in an informed manner, more needs to be known about the extent to which predictive models are generalizable, both within and across organizations. The present study sought to provide some initial information on these issues by examining aspects of external validity of a multivariate model of organizational commitment.

## METHOD

### Variable Selection and Measures

From an examination of previous studies, Steers (1977) proposed that antecedents of organizational commitment could be cast into three categories: personal characteristics of members, role-related characteristics, and work experiences. In selecting variables to represent each of these categories in the present study, several criteria were used. First, the intention was to explain variation in organizational commitment at a level that would prove significant in practical as well as statistical terms with as few predictor variables as possible. Second, an attempt was made to identify variables from the three categories that, while broadly representative of phenomena in their respective categories, also would prove to be relatively independent predictors of commitment. Finally, an effort was made to select variables that were thought likely to yield a comparatively generalizable model of commitment.

Age and education were used to represent the category of personal characteristics, as they have been shown in previous studies to be correlates of commitment (Steers, 1977). An additional variable chosen to represent the personal characteristics category was sense of competence (Wagner & Morse, 1975). This measure taps the extent to which the respondent feels able to manifest his or her effectance motivation (White, 1959) within a particular work setting. Given the growing attention being placed on such self-referent constructs as predictors of work-related outcomes (Dipboye, 1977; Lawler, 1973), sense of competence was examined here as a predictor of commitment. Psychometric information and scale items for the sense of competence index are reported in Wagner and Morse (1975) and Snyder and Morris (1978).

Role conflict and role ambiguity (Rizzo, House, & Lirtzman, 1970) were selected to represent the role characteristics category because both of these variables are broadly representative of phenomena related to the nature and execution of the job and they previously have been shown to be associated with commitment and related work-relevant attitudes (Morris & Koch, 1979). Both role perceptions were measured with items from Rizzo et al. (1970).

The work experiences category involves phenomena that influence the individual's accumulation of normative information about the social context that surrounds the work. Steers (1977) views such experiences (e.g., group attitudes and perceptions of organizational dependability and trust) as "socializing" forces. A potentially important mechanism by which such normative information can become salient to organization members is through the behaviors and sent roles of their formal leaders. For example, Katz and Kahn (1978) describe the powerful influence that leadership can have as a means of integrating both secondary and primary relationships within work groups. To the extent that leader behavior is instrumental to subordinates' accomplishment of official role requirements, the secondary relationships among subordinates that develop from their task interdependencies are lent support. This can help to render task oriented (secondary) relationships a source of positive work experience for subordinates. In addition, the affective quality of interpersonal exchange between the leader and a given subordinate (primary relationship) can constitute an important component of the subordinate's normative work experience. Where such exchanges prove satisfying beyond a purely task-instrumental level, the ability of the leader to act as a socializing influence is likely to be enhanced. In summary, Katz and Kahn argue that leader behavior that successfully integrates primary and secondary relationships can "encourage the development of positive identification with the organization and create ...a degree of personal commitment and identification" (1978, p. 555). Additional discussion of leadership behavior in the context of socialization processes and work experiences is provided by Stogdill (1974) and Pfeffer and Salancik (1975). In view of the potential importance of leader behavior as both a component of work experiences and as a source of socialization, supervisor consideration and initiating structure (Stogdill, 1963) were included as variables in this category.

Table 1 shows descriptive statistics and correlations for all of the study variables. Also shown are alpha coefficients of internal consistency reliability for multiple-item scales.

**TABLE 1**
**Descriptive Statistics, Alphas, and Correlations of Study Variables**
**($N = 506$)**

| *Variable* | $\overline{X}$ | *S.D.* | $\alpha$ | *Zero-Order Correlations*[a]<br>*1* | *2* | *3* | *4* | *5* | *6* | *7* |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Age[b] | 33.16 | 8.47 | — | — | | | | | | |
| 2. Education[b] | 14.01 | 3.84 | — | .30 | — | | | | | |
| 3. Role conflict | 2.81 | 1.05 | .84 | −.13 | .27 | — | | | | |
| 4. Role ambiguity | 3.41 | .96 | .77 | −.14 | .18 | .29 | — | | | |
| 5. Initiating structure | 55.70 | 8.39 | .76 | .15 | −.08 | −.16 | −.24 | — | | |
| 6. Consideration | 87.80 | 19.87 | .93 | .10 | −.09 | −.26 | −.19 | .23 | — | |
| 7. Sense of competence | 3.52 | .61 | .68 | .22 | −.02 | −.18 | −.31 | .19 | .17 | — |
| 8. Organizational commitment | 3.26 | .94 | .91 | .31 | −.26 | −.40 | −.36 | .26 | .29 | .56 |

[a] Correlations greater than .12 are significant at the .01 level (two-tailed test).
[b] In years.

### Research Settings, Data Collection, and Samples

Three facilities involved with the care and training of developmentally disabled persons comprised the research settings. Although the facilities were operated by the same state government, they were widely dispersed geographically within the state, and each fulfilled a somewhat different charter with respect to the nature of its respective resident populations and the types of care and training programs offered. Additional differences among the three organizations included their respective sizes, the number of divisions within each, and methods of grouping the work force (e.g., by functional specialities or "wards" versus client-based groupings or "family cottages"). However, specific job and level classifications were directly comparable across the three facilities.

Questionnaires were administered to employees on time made available by state officials. At each facility, questionnaires were administered to volunteers at intervals in order to represent all work shifts that occurred during the 24 hour coverage provided in such organizations. Virtually all job classifications and organization levels were represented in samples obtained from each facility (total $N = 506$; organization 1, 2, and 3 $N$s were: 280, 107, and 119, respectively). These samples constituted at least 35 percent of the total employee population within each organization.

To prepare for subsequent analyses, job and level classifications were analyzed in a manner similar to that described by Adams et al. (1977). This procedure resulted in a classification of the sample according to job *focus* (whether the job involved direct resident care or indirect support functions) and job *level*, the hierarchical level of the office held by the respondent.

## RESULTS

### Preliminary Analyses

Table 1 indicates that each of the seven predictor variable candidates yielded significant zero-order correlations with organizational commitment. Moreover, the levels of variance shared among the predictor variables were not large (largest shared variation = .10; average among predictors = .04). Therefore, organizational commitment was regressed on each of the predictors in a stepwise multiple regression based on the aggregated sample ($N = 506$). The results of this procedure are shown in Table 2.

**TABLE 2**
**Regression of Organizational Commitment on Antecedent Variables**
**($N = 506$)**

| *Independent Variable* | *Beta* | *Partial F-Ratio* |
|---|---|---|
| Sense of competence | .44 | 152.87** |
| Role conflict | −.21 | 34.31** |
| Education | −.14 | 14.99** |
| Initiating structure | .11 | 9.40* |
| Age | .11 | 9.83* |
| Consideration | .10 | 8.84* |
| Role ambiguity | −.05 | 1.96 |
| | $R_s^2 = .47$; $df = 7, 498$;<br>$F = 63.95$; $p < .001$ | |

*$p < .01$
**$p < .001$

It can be noted from Table 2 that for the combined sample, the seven predictor variables explained 47 percent of the variation in organizational commitment ($F = 63.95$; $p < .001$). Of the seven predictor variables only role ambiguity failed to make a significant ($p < .01$), unique contribution to the variation explained in commitment.

Thus, variables representing each of Steers' (1977) three categories proved to be important components of the model. From the personal characteristics category, the results concerning age and education are consistent with findings reported by other investigators (Hrebiniak, 1974; Sheldon, 1971; Stevens et al., 1978). An additional variable from the personal characteristics category, sense of competence, also emerged as a highly significant predictor of commitment. This finding may suggest, somewhat apart from the exchange approach, that nonextrinsic factors (e.g., effectance) are important influences on commitment—especially to the extent that they influence self-referent processes that may themselves be components of the means by which the individual links his or her identity to the organization. If such is the case, this result is consistent with long-held arguments suggesting that work circumstances that fulfill individuals' growth and achievement needs may yield organizationally positive employee attitudes and levels of involvement (Argyris, 1964; Kornhauser, 1965).

Within the category of role-related phenomena, role conflict but not role ambiguity emerged as a significant ($p < .01$) independent predictor of commitment. This finding for role conflict is convergent with bivariate results reported by Morris and Koch (1979), but the finding for role ambiguity is not. It is possible that the correlation between role ambiguity and competence in the present data provides an explanation for this result. These two predictors shared the highest intercorrelation among the predictor variables ($r = -.31$). However, the degree to which this correlation is artifactual (method based) versus systematic deserves further research because one may argue that a sense of competence is unlikely under conditions of high role ambiguity.

Results in Table 2 also indicate that leadership behaviors may constitute an important and underresearched component in the commitment process. There are frequent crises at virtually all levels in the present research settings, and at the same time an ongoing, significant sense of accomplishment from progress in the care and training of residents is often difficult, at best, to achieve. It is not surprising, then, that high structure/high consideration behavior mixes on the part of leaders tended to be associated with high levels of commitment among subordinates within this sample. Clearly, however, additional research is essential to gain a greater understanding of how different situational factors might influence the efficacy of particular leadership behaviors as socialization influences in the commitment process.

Overall, the results in Table 2 suggest that six of the seven original predictor variables constituted useful and relatively nonredundant components of organizational commitment. Thus, the model appeared worthy of additional examination concerning its generalizability. Interest therefore was turned toward examining the robustness of the model to such important nuisance variables (Kirk, 1968) as job level, job focus, and organizational membership.

To establish the groundwork for these analyses, separate regression equations were generated with the same set of variables shown in Table 2 for each of the three research settings. This step was necessary in order to test the statistical assumption that equal error variances existed among the three separate organization samples that were represented within the aggregated model. Pairwise comparisons were made of the error variances yielded from the three separate regression equations, and within a 90 percent confidence interval the hypothesis of equal error variances proved unrejectable.

### Impacts of Job Level and Job Focus

The first series of generalizability analyses involved examining the aggregated model's sensitivity to the differences in job level and job focus that were present in the samples. These analyses would indicate whether separate models, based on such differences, would yield better predictions of organizational commitment than would the single, aggregate model. In general, these analyses took the following form. First, using an effects coding scheme (Cohen & Cohen, 1975), a vector of cross-products was constructed by multiplying each of the seven predictor variables by dummy variables that represented the categorical factor (e.g., job level) in question. Using the protocol described in Cohen and Cohen (1975), the following hierarchical procedure was employed. First the particular nuisance variable term (e.g., job level) and then the seven predictor variables were used to generate a regression solution for organizational commitment. Afterward, the entire set of related cross-products (predictor/dummy variable pairs) was entered into the model. The difference in the sum of squares of error that resulted from the inclusion of the cross-products over the first step (nuisance variable term and seven predictors) was tested for significance using the relevant formula in Table 3. The procedure, along with significance test information, is discussed fully in Neter and Wasserman (1974).

Job level was the first nuisance variable to be examined within the framework described above. Effects-coded dummy variables were constructed to represent three categories of job level: highest, middle, or lowest third of the organizational hierarchies. Results of the hierarchical analysis described above indicated that the addition of the cross-product terms had no significant influence (actual $p > .10$) on the model (see Table 3). Therefore, in the present data, the addition of job level information (either the main effect term or the cross-products) had no significant effect on the betas assigned to the original seven predictors, or the proportion of variation explained in commitment.

In practical terms, this result suggests that for the present samples the functional interrelationship among these predictor variables vis-à-vis commitment is not significantly disturbed by differences in the hierarchical characteristics of particular offices. For managerial action aimed at improving commitment, this result tentatively suggests that each of Steers' three categories (as represented here) can yield particular action targets that may display a fairly uniform relationship with commitment across organization levels.

The same procedure was subsequently applied using job focus (direct versus indirect resident care) as a dummy variable to construct cross-products. Similar results were obtained for this nuisance variable in that, for the present data, the addition of job focus information failed to alter significantly ($p > .10$) the structural characteristics of the original model or improve the prediction of commitment. These results also are shown in

## TABLE 3
## Generalizability Analyses[a]

| *Nuisance Variable* | *Categories of Nuisance Variable* | *Sum of Squares of Error (SSE)*[b] | *Formula for Impact of Nuisance Variable* $= F$[c] | *F-Values*$_{(df)}$ |
|---|---|---|---|---|
| Organizational membership | Organization 1 ($n_1 = 280$)<br>Organization 2 ($n_2 = 107$)<br>Organization 3 ($n_3 = 119$) | $SSE_{(O)} = 215.39$<br>$SSE_{(D)} = 205.02$ | $\dfrac{\dfrac{SSE_{(O)} - SSE_{(D)}}{(n_1 + n_2 + n_3 - 8) - (n_1 + n_2 + n_3 - 24)}}{\dfrac{SSE_{(D)}}{(n_1 + n_2 + n_3 - 24)}}$ | $F$ observed$_{(16,\ 482)} = 1.52$<br>$F$ critical$_{(\alpha = .05)} > 1.64$ |
| Job level in hierarchy | Highest third ($n_1 = 85$)<br>Middle third ($n_2 = 233$)<br>Lowest third ($n_3 = 181$) | $SSE_{(O)} = 212.21$<br>$SSE_{(D)} = 205.79$ | Same as above | $F$ observed$_{(16,\ 475)} = .92$<br>$F$ critical$_{(\alpha = .05)} > 1.64$ |
| Job focus | Direct care ($n_1 = 395$)<br>Support ($n_2 = 104$) | $SSE_{(O)} = 212.21$<br>$SSE_{(D)} = 207.10$ | $\dfrac{\dfrac{SSE_{(O)} - SSE_{(D)}}{(n_1 + n_2 - 8) - (n_1 + n_2 - 16)}}{\dfrac{SSE_{(D)}}{(n_1 + n_2 - 16)}}$ | $F$ observed$_{(8,\ 483)} = 1.49$<br>$F$ critical$_{(\alpha = .05)} > 1.94$ |

[a] *N*s that do not sum to 506 reflect missing values on the nuisance variable.

[b] $SSE_{(O)}$ is from model that included nuisance term and original predictor variables; $SSE_{(D)}$ is from model to which cross-product terms have been added.

[c] See Neter and Wasserman (1974).

Table 3, and they suggest that the relationship among the present predictor variables vis-à-vis commitment is not directly a consequence of differences in whether the respondents were involved with the operating work of the organization versus its administration.

Together, these results indicate that it is possible to identify at least some variables that manifest a relatively constant relationship with organizational commitment across certain position-related differences that exist as a consequence of organizing decisions. Thus, there is some evidence that certain influences on the commitment process and, ultimately, the levels of commitment need not be viewed as inherently constrained or determined largely by the positioning of an office in organizational space.

### Generalizability Across Organizations

Although the aggregate model appeared robust to certain nuisance variables that are typically of interest on an intraorganizational level, the question remained whether interorganizational differences would influence the model. To address this question, the same analytical procedure described above was applied with effects coded dummy variables representing organizational membership. Results of this analysis indicated that the addition of membership information led to an improvement in precision that approached but did not reach significance ($p > .05$). Thus, the aggregate model appeared to be generalizable across the three organizations that were sampled (see Table 3). A very tentative implication of this result is that although contextual differences may exist between organizations, the direct impact of such differences on the functional interrelationship among the present commitment antecedents may be small. That is, certain sets of phenomena may interrelate with commitment in a configuration that is relatively independent of "anatomical" (Porter, Lawler, & Hackman, 1975) differences among contexts. This is certainly *not* to suggest that different kinds of organizations with different goals and compliance structures (Etzioni, 1961) should be expected to exhibit equivalent levels of given antecedents or levels of commitment itself; rather, it is suggested that certain constellations of antecedent phenomena may interrelate with respect to commitment in a pattern that is robust to at least some organizational and job-related idiosyncracies.

Although the overall results from the tests of generalizability lend encouragement to the aim of constructing a general theory of commitment process, a great deal of caution is warranted at this point. Specifically, it should be noted that analyses of external validity such as those described above may suffer at least two important limitations. First, the issue of external validity or generalizability is never settled. One can gain confidence in the sort of model described here only as it is subjected to repeated assaults and theoretically or practically important nuisance variables fail to disturb it. Put simply, research of this kind demands replication across a body of different settings conducted by independent investigators. In addition, the kinds of analyses described here are subject to Type II error. That is, a failure to detect disturbances by such nuisance variables can be due potentially to insufficient power in the statistical test when applied to a given set of data. Consequently, all analyses of this sort should be subjected to a power survey (Cohen, 1962) to determine whether sufficient power was available to avoid Type II error at a tolerable level of probability. A power survey of the present data indicated strong power levels for the statistic and therefore a very low likelihood that these results reflected Type II error—power $> .90$ at $\alpha = .01$, with "medium" expected effect size (Cohen & Cohen, 1975).

## DISCUSSION

This study attempted to develop a multivariate model of organizational commitment that was grounded in the theoretical framework provided by Steers (1977), and examine aspects of its generalizability. The selection of particular variables to represent each of Steers' three categories of commitment influences was focused on yielding practically as well as statistically significant levels of explained variation in commitment with variables that might prove meaningful to managers and researchers.

In general, the results provided further evidence for the utility of Steers' theoretical framework as a guide to identifying potential influences on organizational commitment. Moreover, the particular model examined here appeared to be generalizable across differences in job focus and hierarchical level, as well as across the three organizational samples represented in the data base.

A discussion regarding each individual predictor variable was included in the previous section. Of greater importance at this point, perhaps, is a discussion of the implications that stem from examinations of external validity or generalizability of the overall model. Until this time, no studies have examined directly the extent to which multivariate commitment models are robust to intra- and interorganizational differences; and, yet, information about this issue is vitally important on both practical and theoretical grounds. From a practical standpoint, variables that yield a relatively generalizable model of commitment will help to provide specific targets for managers who wish to develop general strategies for improving levels of commitment. However, the present results indicate that commitment-building efforts might best be served with programs that take a rather eclectic approach. That is, to construct effective commitment programs it seems that managers will need to attend not only to multiple variables but to the as yet poorly understood interrelationships among them as well. Overall, then, it appears that a good deal more research will be necessary before the commitment concept becomes as useful on a practical level as it is on a theoretical level.

In addition to increasing the practical utility of the commitment concept, information about the external validity of commitment models is also central to answering questions that surround commitment research. Specifically, a comparison of the present findings with the divergent results of Steers (1977) and Stevens et al. (1978) brings into focus some important unresolved research issues. It will be recalled from an earlier section that Steers' empirical results led him to conclude that variables representing personal, role, and work experiences all constituted important influences on organizational commitment. Results of the present study support this argument and appear to add to its generalizability by sampling different particular independent variables to represent each of Steers' three categories. In contrast, Stevens et al., proceeding also from Steers' categories of antecedents, concluded that role-related variables were more important predictors of commitment than were other categories of variables.

An initial attempt to reconcile these two arguments might yield the suggestion that differences among the sets of predictor variables between studies provides the basis for the differential abilities of Steers and Stevens et al. to explain variation in commitment ($R^2$s$>.48$ and $<.16$, respectively). If such reasoning is used, the most immediately important thrust of future commitment research seems clear—continued concentration of efforts on identifying antecedent variables that have the most generally profound influence on commitment.

However, when the present study is taken in conjunction with the Steers and Stevens et al. results, it can be argued that interstudy discrepancies between Steers and Stevens et al. may be due at least as much to differences among their measures of commitment as to differences among their respective sets of predictor variables. Neither Steers, Stevens et al., nor the present investigators used closely overlapping predictor variable sets. Therefore, none of these three studies can be compared directly as "replications." Yet the present study and that of Steers did use the same measure of commitment, and both arrived at similar levels of variation explained in commitment with significant independent contributions made by variables from each of the three antecedent categories. Thus, in view of the similarity of results between Steers and the present study and the comparative dissimilarity of the Stevens et al. results, a critical focus on the dependent measures would seem to provide a more logically grounded path to reconciliation than would a focus on differences among the respective sets of predictor variables.

To the extent that organizational commitment investigators are, in fact, representing dissimilar constructs among their differing measures of commitment, little progress can be made toward providing convergent empirical documentation for a general theory of commitment processes. Indeed, continued research aimed at deriving ever more potent predictors of commitment would, under such circumstances, be likely to confuse the literature further. Rather, when integrated with the work of Steers and Stevens et al., the present findings suggest that an immediate aim of subsequent commitment research should be to provide evidence about the convergent and discriminant validity of the various existing measures of organizational commitment. Until such information is provided for potentially competing measures, the growing evidence rather strongly indicates that the use of Porter's measure is advised. As was noted earlier, this measure is the only one to have substantial documentation relating it to behavioral *outcomes* in organizations, and it also has a substantial body of reliability and validity information available. In addition, the antecedent framework provided by Steers (1977) is grounded in the theoretical underpinnings of the Porter measure specifically. Thus, those who wish to investigate commitment antecedents from the Steers' framework should consider carefully the underlying theoretical dimensions of any competing measure that is used to index organizational commitment.

The need for the above kind of information becomes even more crucial in the face of attempts to reconcile differences between the so-called psychological and exchange approaches to commitment. Both of these approaches have rich theoretical underpinnings and, perhaps, much usefulness as frameworks within which to investigate the commitment process. At present, however, empirical translations of the two theoretical approaches into measures may have led investigators into a situation in which they are method bound. That is, if independent commitment investigators are able to achieve converging results only when a common measure of commitment is used, little hope can be held for arriving at an integration of potentially useful components of both the psychological and exchange approaches into empirical studies of commitment. Nor, under such circumstances, can the *relative* merits of the psychological approach and the exchange approach be assessed empirically without great risk of confounding.

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# *Effects of Withdrawal of a Performance-Contingent Reward on Supervisory Influence and Power*

**CHARLES N. GREENE**
**Indiana University**
**PHILIP M. PODSAKOFF**
**The Ohio State University**

*A field experiment was conducted to investigate effects of removal of a performance-contingent reward on subordinates' perceptions of their supervisors' sources of influence. A significant increase was found in perceptions of supervisors' use of punishment, but reward, referent, and organizationally-sanctioned power declined significantly. Expert power was unaffected by removal of the incentive system.*

Although concepts of influence and power have commanded much attention and pragmatic interest in the literature on leadership and behavior in organizations, little research has been conducted on this subject. And the research that has been reported has focused predominately on the effects (or presumed effects) of power as an independent variable on measures of organizational effectiveness. Almost totally disregarded have been (1) consideration of power as a "dependent" variable and (2) questions about the effects of changes in a primary source of power on other bases of power (Raven, 1974).

The research reported here is a quasi-field experiment designed to investigate the effects of removing a pay incentive on the bases of power of supervisors who had administered the incentive plan—where the pay incentive represents a primary source of reward power (Cherrington, Reitz, & Scott, 1971; Opsahl & Dunnette, 1966; Yukl, Wexley, & Seymore, 1972; Greene, 1973; Chung & Vickery, 1976; Farr, 1976). The investigation was conducted in industrial plant settings with lower level participants (i.e., first-line supervisors and operative level personnel), for which there is considerable evidence (Etzioni, 1975; Lawler, 1971) that reward power (and particularly pay, itself) constitutes a primary source of influence.

## PROPOSITIONS

In addition to reward power, most conceptions of social power (Russell, 1938; Dahl, 1957; French & Raven, 1959; Gilman, 1962; Raven, 1974) encompass a number of other relevant sources of influence—for example, perceived ability to punish, perceived expertise, information, legitimate or positional bases, upward influence, and liking, personal power, or other referent bases. For purposes of the present study, French and Raven's (1959) schema was utilized in modified form, largely because of its widespread and apparent lasting appeal. The bases of power are therefore defined here as: subordinates' perceptions of their supervisor's ability to mediate (1) rewards (reward power) and (2) punishments (coercive or punishment power); (3) their beliefs that their supervisor possesses needed information or expertise (expert power); (4) their personal identification with or liking for their supervisor (referent power); and (5) their perceptions that their supervisor is officially empowered with, or given by position, the right to prescribe behavior for them (legitimate power).

A sixth dimension, upward or hierarchical influence, however, was added, given that there is evidence (House, 1971; House, Filley, & Gujarati, 1971) that suggests that the extent to which the supervisor is perceived as commanding respect of higher management and can represent subordinates to higher management is an important factor in determining the amount of influence the supervisor has over subordinates. This conception of upward influence, however, probably is not independent of legitimate power. Both represent organizationally sanctioned bases of power; the former informally and the latter formally by management.

### Reward Power

There exists considerable evidence that performance-contingent pay serves as an effective reinforcer of human behavior (Cherrington et al., 1971; Chung & Vickery, 1976; Farr, 1976; Greene, 1973; Nash & Carroll, 1975; Opsahl & Dunnette, 1966; Yukl et al., 1972). Thus, *it is predicted that subordinates' perceptions of their supervisor's ability to mediate rewards will decline as a result of withdrawal of the pay incentive for their subordinates*. This prediction is based on two assumptions. First is the assumption that supervisors do in fact have considerable discretion in allocation of pay increments as opposed to allocation on a more or less prescribed or automatic performance-contingent pay basis. The second assumption, also suggested by Opsahl and Dunnette (1972), is that pay is an important reward, particularly at the operative level, that affects perceptions even of nonmonetary rewards (Cherrington et al., 1971; Lawler, 1971; Yukl et al., 1972; Cortland & Lawler, 1973; Greene, 1973; Etzioni, 1975; Chung & Vickery, 1976).

### Punishment Power

Faced with pressures to maintain productivity, supervisors who have lost the ability to provide rewards for subordinates contingent on their performance may resort to increased use of punishment to sustain acceptable productivity levels. Indeed, Hamner and Organ (1978) suggest that in such a circumstance punishment (whether intentional or unintentional) is one of the most readily available means for shaping (and, presumably, maintaining) the behavior of subordinates. *Thus, it is predicted that if a pay incentive has been removed, subordinates will perceive their supervisor as increasing emphasis on punishment contingent on their performance.*

### Referent Power

Research on interpersonal attraction has isolated several factors that affect one's "liking" of another person. Among the major findings is that individuals who administer or who are associated with rewards or with punishments are more or less liked, respectively (Byrne, 1970; Byrne & Clore, 1970). That is, one's liking or attraction for individuals associated with rewards tends to increase, and our liking or attraction for individuals associated with punishers tends to decrease. It has, of course, been well established that the removal of a positive reinforcer serves as an effective punitive event (Kazdin, 1975). From these lines of research one might argue that *the supervisor associated with withdrawal of a monetary reward will be less liked and subsequently should have less ability to influence subordinates on the basis of his perceived referent power.*

### Expert Power

Of all the bases of power, it is perhaps most difficult to make specific predictions concerning expert power. This basis of power has been linked by Reitz (1977) and Cartwright (1965) to reward power, presumably to the extent that rewards are contingent upon performance, because subordinates' ability to distinguish between desired and undesired behavior may increase their perceptions of their supervisor's knowledge and credibility. This particular linkage, however, has not been supported empirically. Furthermore, as Raven (1974) contends, expert power is perhaps least affected by changes in other bases of power. Indeed, it would seem that perceptions of expertise would be associated with subordinates' needs for specific information and skills, and linked to rewards *only* when their information needs concern reward practices. Therefore, one could predict that *a supervisor's expert power would be unaffected by removal of a pay incentive unless subordinates' needs for information concern pay.* Without such knowledge about subordinates, however, this proposition must be considered quite speculative.

### Legitimate Power and Upward Influence

Based on Etzioni's (1975) propositions and supporting evidence, rewards (and particularly pay) constitute one of the most important, if not the most important, sources of influence for operative personnel in industrial organizations. One might predict that *loss of control over pay might be associated by operative personnel with a commensurate decline in their perceptions of their supervisor's influence with higher level management*, given that the supervisor no longer has the ability to negotiate monetary rewards for them with top level management. Indeed, if monetary rewards represent an important resource, and one over which a supervisor has considerable discretion in its allocation, then the loss of such a resource may even result in subordinates' tending to disassociate their supervisors from "management." In other words, they perceive their supervisors as having less legitimate power.

## METHOD

### Research Sites

The research sites consisted of two autonomous plants, both paper mills of a large manufacturer of paper and paper products. The authors know of only one significant difference between the two plants—the pay system employed. One plant represents an example of the trend away from use of performance-contingent pay plans. This plant, after four years, abandoned its pay incentive plan, largely because of what appears to be poor management-employee relations and problems encountered in applying the pay incentive plan—as evidenced, according to plant management, by an excessive amount of complaints and formal grievances related to the pay plan and union opposition to it. As a result, plant management removed the pay incentive system and implemented a flat-rate pay system at the operative level with automatic progression in rate range and seniority as the primary determinant of advancement. Wage levels are to be made equal over time to the average wage level under the incentive plan plus a factor added for cost-of-living increases. The nonperformance-contingent pay plan was implemented on July 1, 1977.

The second plant, which served as the control group, for the past six years has employed and continues to employ an incentive plan virtually identical to the plan abandoned by the first plant (the experimental group). The incentive plan, which was developed for both plants with the assistance of the division personnel staff, involves a conventional appraisal system with one common set of job responsibilities and performance criteria for production personnel and another for personnel performing support functions. Appraisals are conducted monthly by the subordinate's immediate supervisor (first-line manager) according to the following procedure. For each appraisal, the supervisor first compares the subordinate's performance with that of all other subordinates on several dimensions—for example, quality and quantity of performance, waste, attendance, conduct on the job, cooperation, attitude toward work—which are then translated by the supervisor onto 7-point scales, anchored by the statements, "very low, requiring immediate improvement" and "exceptional." Finally, the supervisor provides an overall, global evaluation by averaging his or her evaluations (judgments) on each of the appraisal dimensions that he or she selected for a given subordinate. These particular appraisal results are the major determinants, in conjunction with changes in plant productivity, of the monthly wage incentive for operative personnel. Operative personnel could earn from 0 to 10 percent of their base pay on the basis of monthly increases in plant productivity and up to 20 percent on the basis of their individual performance (the pay incentive).

### Sample

The sample at the plant that abandoned the pay incentive (the experimental plant) was comprised of 37 (all) first-line managers and their subordinates ($N = 392$). The control group consisted of 45 (all) first-line managers and their subordinates ($N = 526$). The questionnaire items were completed by the immediate subordinates of each manager. The spans of control of managers extended from 7 to 25 with a mean of 11 subordinates.

The subjects in the two plants are comparable on a number of dimensions. All subjects are either first-line managers or their subordinates (operative level personnel), and there are no significant differences between plants in terms of plant tenure, salary, and gender (all $t$'s, $X^2$'s $\leq .67$, $p$'s $> .50$), using the initial (time 1) data. The operative level tasks performed by subordinates are identical at both plants and include production jobs (e.g., washer operator, refiner operator, backtender, pulping helper, turbine operator, and lime kiln operator) and support jobs (e.g., maintenance; vehicle operators; shipping, scaling, and testing jobs; and fabrication). Furthermore, the paper mills themselves are identical with respect to organization and product, part of the same company division, of approximately equal size, organized by the same union, and are located in small midwestern towns within 100 miles of each other.

### Measures

Both reward power and punishment power were assessed by means of items taken in modified form from the contingency questionnaire developed by Scott, Reitz, and Johnson and published initially in Johnson (1970). Reward power (six items) refers to the degree to which the supervisor is perceived by subordinates as providing rewards, such as recognition and pay and promotion recommendations, contingent upon performance. Punishment power, on the other hand, was assessed by four items that tap subordinate perceptions of the extent to which their supervisor administers punishment contingent upon performance. Both of these measures have been found to be independent factorially and have acceptable internal reliabilities (Greene, 1976; Sims, 1977). In the present study, the split-half (Spearman-Brown) reliability coefficients extended from .70 to .81 (all $p$'s $<.01$) for the two data collection periods. The test-retest reliabilities (correlations between the pre- and post-measures) in the control group were .66 and .90 (all $p$'s $<.01$) for reward power and punishment power, respectively.

The single-item indices devised by Student (1968) were utilized to measure expert power and referent power. Subordinates indicated the extent to which they complied with their supervisor's directives because they "respect his (or her) experience and good judgment" (expert power) and because "he (or she) is a good guy and they like him" (referent power). These two items have been shown to have predictive validity in a number of studies (Bachman, 1968; Student, 1968). The only indications of reliability in the present study were the test-retest reliabilities of .95 and .87 (all $p$'s $<.01$) obtained in the control group for the expert and referent bases, respectively.

Legitimate power also was assessed using one of Student's items: compliance because the supervisor "has a right, considering his (her) position, to expect subordinates to do what he (she) wants." Upward or hierarchical influence was measured by the 4-item instrument developed by Comrey, Pfiffner, and High and reported in House et al. (1971). Not surprisingly, preliminary analysis of the data revealed a strong correlation between these two particular measures ($r=.84$, $p<.01$), and thus they were combined into a single measure labeled organizationally-sanctioned power. The organizationally-sanctioned power measure now reflects not only positional or "legitimized" power but also power based on "getting certain benefits for subordinates from superiors," "affecting decisions made by 'higher-ups,'" and "being well respected by higher management." The Spearman-Brown internal reliability estimates obtained for this combined measure were .73 and .70 (all $p$'s $<.01$) for the "before" and "after" measures, respectively. The control group test-retest reliability coefficient was .79 ($p<.01$).

The alternative responses for all five measures of power were cast in a Likert-type format with the score values extending from 1 (strongly disagree) to 5 (strongly agree). In order to provide comparability, after "outliers" had been removed, the scores for each manager on each measure were summed and then divided by the number of items contained in the measure and the number of subordinates completing the questionnaire for each manager. Thus, the findings reported in the section on results all extend from 1 to 5 for each measure.

### Analytical Procedures

A "before-and-after" design was employed with identical measures of the variables—the five sources of supervisory influence—taken from the same subjects at two points in time. The "before" (pre-change) measures were obtained in May, 1977, two months prior to the removal of the performance-contingent pay plan in the experimental plant. The "after" (post-change) measures were obtained in July, 1978, 12 months after the pay incentive was removed (or 14 months after the "before" measures were taken). Neither operative nor supervisory personnel in the experimental plant were informed of the change in the pay plan until two weeks prior to its implementation (or approximately six weeks after the before-measures were taken). Furthermore, there were no indications whatsoever that the subjects had any knowledge of the pending change when the researchers collected the before-measure data.

Traditionally, changes in dependent variables in before-and-after control group designs, such as the one employed in the present study, have been assessed by means of "change scores" (Campbell & Stanley, 1963). Using this method, mean scores on all of the variables are computed for each of the two time periods, and then "change scores" (differences between the "before" and "after" means in the experimental and control groups) are calculated. The significance of the differences in the change scores are then assessed using *t*-tests. Change score analysis, however, is not appropriate when there are several interrelated measures to be analyzed simultaneously, as was the case in the present study. A multivariate technique that acknowledges high intercorrelations among the multiple dependent variables is required. Therefore, a repeated-measures MANOVA design was used.

According to the MANOVA procedure, questions about possible changes in supervisors' sources of influence, after withdrawal of the incentive plan, are answered by examining the interaction term of the five dependent measures. In this particular analysis, the "between" subject's factor (groups) consists of the experimental and control plants, and the "within" subject's factor (time period) consists of the before and after measures. A significant *F* ratio for the interaction term indicates that the two groups differed with respect to at least one of the dependent variables.

Following utilization of the MANOVA procedure, repeated-measures univariate *F* tests (ANOVA) and discriminant analysis were employed to determine which of the dependent variables changed and the extent it produced differences between the experimental and control plants. Use of these two procedures (ANOVA and discriminant analysis) thus enables one to assess the relative contributions of each of the dependent variables and to interpret further the multivariate data structures obtained. For these reasons, ANOVA and discriminant analysis should be combined with use of MANOVA whenever questions of magnitude and specificity of change among interrelated variables need to be addressed (Borgen & Seling, 1978).

As a preliminary step in the analysis, however, the equivalence of the experimental and control plants on the five dependent variables was assessed first. This was accomplished by computing *t*-tests for the significance of differences between the experimental and control groups using the before measures of each of the sources of supervisory influence.

## RESULTS AND DISCUSSION

None of the results of the $t$-tests for differences between the experimental and control plants on the means of the before measures for each of the sources of supervisory influence were significant (all $t$'s $\leq 1.60$, all $p$'s $> .10$). The intercorrelations between all five dependent measures are reported in Table 1. All of these correlations were significant ($p$'s $< .01$), except for the correlations between: (1) reward power and punishment power, (2) expert power and punishment power, and (3) referent power and organizationally-sanctioned power.

### Manipulation Check

In order to assess the extent to which subordinates perceived that their supervisors played an active role in determining their merit pay (that is, evaluated their performance and paid them accordingly versus merely acting as a conduit or even a bystander), the two following previously unused items from the contingency questionnaire were utilized.

13. My supervisor would recommend a pay increase for me which will be consistent with his/her evaluation of my performance.
14. My supervisor would be able to insure that my next pay increase will be consistent with the amount he/she recommended.

Both items were assessed by means of a 5-point Likert-type format, and scores were combined for purposes of analysis.

If, in fact, removal of the pay incentive (experimental condition) did have the predicted effect, one would expect subordinates to see their supervisors as having little control over pay and no relationship between their pay and the now nonexistent appraisal system. The results of this analysis were perfectly consistent with the predictions. In the experimental group, the mean score (on these two items combined) declined from 3.89 to 1.57 (the difference was 2.32; $t = 8.83$, $p < .01$), thus indicating the declining role played by the supervisors after removal of the pay incentive.

**TABLE 1**

**Correlations Between Dependent Variables Across All Conditions**
**($N = 82$)**

| *Dependent Variable* | *1* | *2* | *3* | *4* | *5* |
|---|---|---|---|---|---|
| 1. Reward power | 1.00 | | | | |
| 2. Punishment power | .19 | 1.00 | | | |
| 3. Referent power | .40* | -.39* | 1.00 | | |
| 4. Expert power | .41* | .06 | .57* | 1.00 | |
| 5. Organizational power | .58* | .56* | .09 | .31* | 1.00 |

*$p < .01$

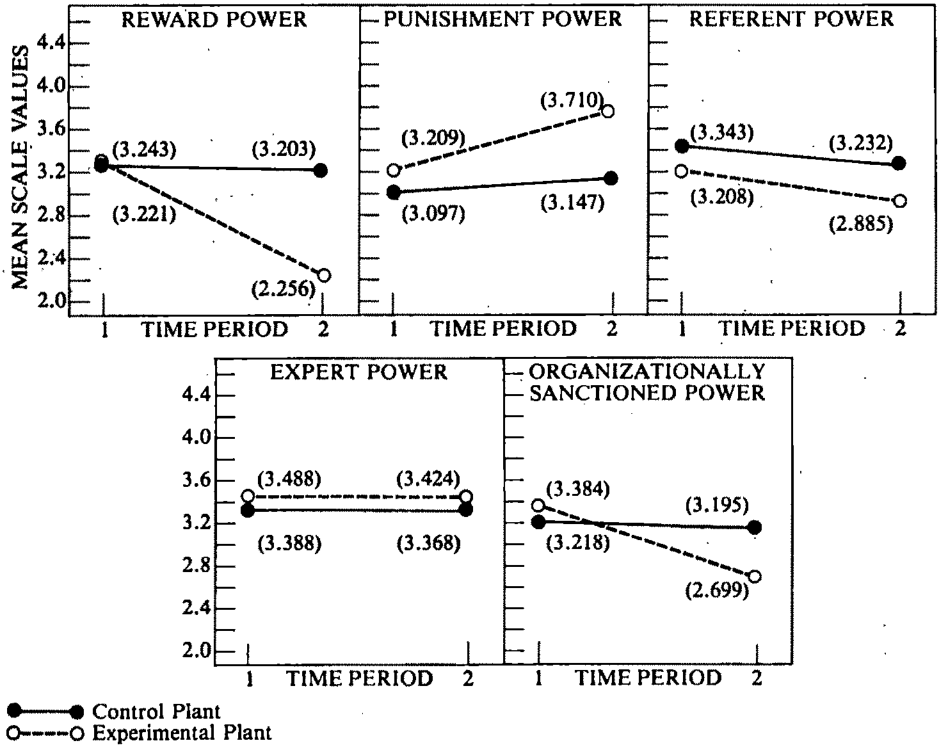
In the control group, on the other hand, the supervisor remained quite active in his or her role in determining merit pay. The combined mean score changed little from the before to the after condition—from 3.97 to 3.86 (difference = .11; $t = .26$, n.s.).

### Multivariate and Univariate Analysis of Variance

Results of the repeated measures MANOVA indicate that the main effects of groups and time periods are both significant (multivariate $F = 6.93$, $df = 5/76$, $p < .001$ and multivariate $F = 27.76$, $df = 5/76$, $p < .001$, respectively). In other words, there are significant differences between the before and after measures and also between the experimental and control groups. More importantly, the groups × time periods interaction also was significant; multivariate $F = 26.13$, $df = 5/76$, $p < .001$. That is, there are significant differences between the experimental and control groups in the subordinates' perceptions of their supervisor's bases of power that are directly attributable to the withdrawal of the pay incentive.

As discussed earlier, repeated measures ANOVA were employed to determine the specific bases of power that changed and the direction in

**FIGURE 1**
**Mean Scale Values of Sources of Supervisory Influence for Experimental Versus Control Plants**



which each base changed (that is, whether it increased or decreased). The mean scale values of each of the bases of supervisory power in both the experimental and control plants in time periods 1 and 2 are displayed in Figure 1. Table 2 provides a summary of the analysis of variance for the differences between the two plants on the individual bases of power. Primary emphasis is placed on the groups × time periods interactions, which reflect the effects that removal of the incentive plan has on subsequent changes in supervisory power.

*Reward Power*—Results of the repeated measures analysis of variance on the reward power scale indicate a significant group effect ($F = 15.26$, $df = 1/80$, $p < .001$), a significant time period effect ($F = 31.41$, $df = 1/80$,

### TABLE 2
### Analysis of Variance of Differences in Sources of Supervisory Influence Between Experimental and Control Plants

| *Source* | *SS* | *df* | *MS* | *P* |
|---|---|---|---|---|
| *Reward power* | | | | |
| Between Ss | | | | |
| Group | 9.53221 | 1 | 9.53221 | 15.25525** |
| Error between | 49.98783 | 80 | .62485 | |
| Within Ss | | | | |
| Time period | 8.56555 | 1 | 8.56555 | 31.41389** |
| Group × time interaction | 8.68324 | 1 | 8.68324 | 31.84552** |
| Error within | 21.81341 | 80 | .27267 | |
| *Punishment power* | | | | |
| Between Ss | | | | |
| Group | 4.63810 | 1 | 4.63810 | 7.32719* |
| Error between | 50.63991 | 80 | .63300 | |
| Within Ss | | | | |
| Time period | 2.63293 | 1 | 2.63293 | 55.66510** |
| Group × time interaction | 2.06779 | 1 | 2.06779 | 43.71627** |
| Error within | 3.78403 | 80 | .04730 | |
| *Referent power* | | | | |
| Between Ss | | | | |
| Group | 2.36001 | 1 | 2.36001 | 2.74550 n.s. |
| Error between | 68.76735 | 80 | .85959 | |
| Within Ss | | | | |
| Time period | 1.74565 | 1 | 1.74565 | 23.42188** |
| Group × time interaction | .46070 | 1 | .46070 | 6.18131* |
| Error within | 5.96245 | 80 | .07453 | |
| *Expert power* | | | | |
| Between Ss | | | | |
| Group | .24432 | 1 | .24432 | .38931 n.s. |
| Error between | 50.20605 | 80 | .62758 | |
| Within Ss | | | | |
| Time period | .06600 | 1 | .06600 | 2.94612 n.s. |
| Group × time interaction | .01975 | 1 | .01975 | .88144 n.s. |
| Error within | 1.79220 | 80 | .02240 | |
| *Organizationally-sanctioned power* | | | | |
| Between Ss | | | | |
| Group | 1.10685 | 1 | 1.0685 | 2.25429 n.s. |
| Error between | 39.27973 | 80 | .49100 | |
| Within Ss | | | | |
| Time period | 4.24976 | 1 | 4.24976 | 32.22501** |
| Group × time interaction | 4.45320 | 1 | 4.45320 | 41.10281** |
| Error within | 8.66744 | 80 | .10834 | |

*$p < .01$
**$p < .001$

$p < .001$) and, of greatest importance, a significant group × time period interaction ($F = 31.85$, $df = 1/80$, $p < .001$). Analysis of the mean data in Figure 1 suggests that these differences are produced by a reduction in the perceived ability of supervisors in the experimental plant to administer performance-contingent rewards. As noted earlier, there is a sizable amount of evidence indicating that monetary incentives serve as effective reinforcers for human behavior. It, therefore, should come as no surprise that in the wake of the removal of a performance-contingent pay plan, a supervisor will be perceived to have less ability to influence subordinate behavior via rewards.

*Punishment Power*—Consistent with the earlier prediction, the results of the ANOVA for repeated measures provide evidence of a highly significant group × time period interaction ($F = 55.67$, $df = 1/80$, $p < .01$) for the punishment power measure. As the mean data indicate, subordinates in the experimental plant tended to believe that their supervisors administered significantly more punishment ($\bar{x} = 3.71$) after the pay incentive withdrawal than did subordinates in the control plant did ($\bar{x} = 3.15$). This suggests that one way that supervisors may compensate for the loss in their ability to control rewards is to increase their use of punishment. As an alternative explanation of these particular findings, it is possible, of course, that the subjects experienced perceptual contrast in that removal of the pay incentive may have led them to perceive that their supervisors used more punishment.

At any rate, punishment has been shown to control human behavior effectively (Kazdin, 1975). However, some empirical evidence (Greene, 1976) suggests that the administration of performance-contingent punishment on the part of supervisors produces expressions of negative effect in the form of dissatisfaction and may subsequently lead to increases in both turnover and absenteeism. Thus, supervisors who lose the ability to control significant monetary reinforcers for subordinates may be in an unenviable position not only because they are perceived to possess less reward power but also because attempts by them to maintain their influence by increasing their use of punishment may lead to other, unforeseen dysfunctional consequences.

*Referent Power*—Analysis of the data in Figure 1 and Table 2 suggest that supervisors who no longer control monetary rewards are less liked and thus experience a loss in referent power. These results indicate that significant differences between the control and experimental groups existed on the measure of referent power after the removal of the pay plan (group × time period $F = 6.18$, $df = 1/80$, $p < .01$) and that this difference was in the form of a decline in the perceived referent power of the experimental group supervisors.

*Expert Power*—Analysis of the responses of individuals in both the experimental and control plants on the expert power scale indicates that there were no significant differences for groups ($F = .38931$, $df = 1/80$, n.s.), time periods ($F = 2.94612$, $df = 1/80$, n.s.) or groups × time periods

($F = .88144$, $df = 1/80$, n.s.) effects. It would appear, therefore, that at least one source of power that is maintained by a supervisor (after the removal of a rather significant performance-contingent reward) is based on his/her perceived expertise. Unfortunately, in contrast to other bases of power, expert power is usually restricted to those specific skills or knowledge possessed by the supervisor that are perceived by his or her subordinates to be important to them. Moreover, as pointed out by some authors, for example, Reitz (1977), as subordinates acquire more experience and the supervisor imparts his/her knowledge to them, the supervisor may lose much of his expertise:

> One can also lose expert power by using it. If I teach you everything I know about trout fishing, I will have expert power in that area over you no longer, for you'll know everything I do about trout fishing. If a secretary knows more about the boss's files and schedule than the boss does, the secretary has some expert power. If the secretary organizes and arranges that information to make it instantly and easily available to the boss, the secretary may gain gratitude but lose expert power. One of the most common complaints of low-ranking employees is that "the boss never tells me anything." One obvious reason why bosses are reluctant to share all of their knowledge is the fact that knowledge is power—until it is shared (Reitz, 1977, p. 471).

Thus, eventually supervisors in the experimental plant may find that even this source of influence is of limited use for effecting behavioral changes.

*Organizationally-Sanctioned Power*—The perception that a leader possesses an organizationally-sanctioned base of power was influenced by the removal of the incentive pay plan (group × time period $F = 41.10281$, $df = 1/80$, $p < .001$). Subordinates in the experimental plant perceived their supervisors to have less organizationally-sanctioned power ($\overline{x} = 2.70$) after the withdrawal of the performance-contingent pay system than did subordinates in the control plant ($\overline{x} = 3.20$). This finding perhaps is among the more meaningful ones in this study because it implies that the removal of a significant performance-contingent reward—especially one over which a supervisor has some direct control—may lead subordinates to believe that their supervisor has less right to prescribe behavior for them. This belief undoubtedly will have undesirable effects for supervisors. At least one outcome likely to occur is that subordinates in the experimental plant probably will feel less obligated to comply with the requests of their supervisors.

### Discriminant Function Analysis

Table 3 contains the discriminant structure matrix for the five measures of power utilized in the discriminant equation. The matrix consists of correlations of each of the dependent measures with the discriminant function composite score vector and indicates the relationship of each of the measures utilized in the analysis to the discriminant function.

The total discriminatory power of the discriminant function analysis, which was calculated by using multivariate approximation to $\omega^2$ developed by Tatsuoka (1970), was 63 percent. The function was significant ($p <$ .001) and, as indicated in Table 3, accounted for approximately 80 percent

TABLE 3
Structure Matrix and Percentage of Variance Explained by the Two-Group Discriminant Function Analysis

| *Measure* | *Function* *1* |
|---|---|
| Reward power | .48 |
| Punishment power | −.56 |
| Referent power | .21 |
| Expert power | .08 |
| Organizationally-sanctioned power | .55 |
| Percent variance explained by the discriminant function | .795 |

of the variance between the two groups. As revealed in the matrix, the punishment power, organizationally-sanctioned power, and reward power measures are most highly related to the discriminant function that maximally separated the experimental and control groups. Referent power, although less important, also contributes to the differences between two groups. Consistent with the earlier prediction, expert power provided little additional information on which the groups can be differentiated. Comparison of the original group means from Figure 1, as well as the univariate *F* ratios for these variables reported in Table 2, provides further support of these findings. They indicate that withdrawal of the performance–contingent incentive system evidently caused supervisors to resort more to use of punishment and to decline in both reward and organizationally–sanctioned power. Referent power also declined significantly, but much less so than any other of the bases of power that declined.

## Rival Hypotheses

There are at least two plausible alternative explanations of the results just discussed that need to be ruled out, however, before one can draw meaningful conclusions from these results. First, withdrawal of the pay incentive may represent management's unilaterally removing an important source of a supervisor's influence, and thus what the subordinates observed was simply a general weakening of their supervisor's position. Should this have been the case, however, one would have expected all five bases of power to decline. This clearly did not happen. Although the supervisors' reward and organizationally-sanctioned bases of power did decrease rather dramatically and, to a much lesser degree, so did referent power, expert power remained unchanged after removal of the pay incentive, and punishment power increased! These particular results are not consistent with the rival hypothesis.

A second rival explanation of the results obtained concerns the possibility that removal of the merit pay plan, previously administered by the supervisors, produced a decrease in satisfaction with pay expressed by subordinates, which then caused subordinates to underestimate their supervisor's power on all dimensions, but particularly on reward power. In other words, the results may have been affected by pay dissatisfaction and a resultant negative halo effect. Central to this alternative explanation is the assumption that subordinates' satisfaction with pay indeed did decline in the experimental group. This, however, simply *did not occur*. Satisfaction with pay, assessed by means of the Job Description Index (Smith, Kendall, & Hulin, 1969), actually *increased* after withdrawal of the pay incentive in the experimental group. See Greene and Podsakoff (1978) for a preliminary report of these results. The increase in mean pay satisfaction was 3.15, $t = 4.12$, $p < .01$. In contrast, there was virtually no change in subordinates' reports of pay satisfaction in the control group (.08, n.s.). The difference between the two change scores, the experimental versus control group, of 3.07 was highly significant ($t = 4.38$, $p < .01$). Thus, this rival hypothesis also can be refuted.

## SUMMARY AND CONCLUSIONS

This investigation, conducted in a natural field setting, appraised the effects that the removal of a primary base of power has on subordinate perceptions of other sources of supervisory influence. Consistent findings were obtained by using three different analytical procedures—MANOVA and the ANOVA and discriminant function analyses.

The effects that the withdrawal of the performance-contingent incentive plan has on subsequent changes in the perceived bases of supervisory influence in the "experimental" plant were, for the most part, rather dramatic when compared with the "control" plant. The results indicated that perceptions of a supervisor's reward, referent, and organizationally-sanctioned bases of influence all declined significantly after the pay plan was withdrawn in the experimental plant. Organizationally-sanctioned and reward based powers declined the most. These results—especially the finding that subordinates in the experimental plant perceive their supervisors to have less organizationally-sanctioned power and, therefore, less right to prescribe their behavior—suggest that supervisors who lose a primary source of power may subsequently find subordinates less willing to comply with their directives or requests.

In contrast to its effects on reward, referent, and organizationally-sanctioned power, the withdrawal of the pay plan in the experimental plant led to an increase in the subordinates' perceptions that their supervisors used punishment as a source of influence. It would appear, therefore, that when pressure to maintain performance at high levels continues to exist, supervisors may compensate for the loss in their ability to control significant rewards for their subordinates by resorting to the increased use of punishment. Unfortunately, this strategy, as the literature in the field strongly implies (Hamner & Organ, 1978), may evoke self-reports of dissatisfaction and subsequently produce increases in absenteeism and turnover.

Expert power was the only base of power that remained relatively unchanged by the removal of the performance-contingent pay system. This finding may be interpreted as indicating that a supervisor's perceived expertise may continue to serve as a source of influence over subordinates when other bases of power have eroded, but probably only in that limited range of behavior for which the supervisor's skills or knowledge are perceived to be important to the subordinates.

In summary, this research suggests that the removal of a primary base of power does have subsequent—and in this case primarily dysfunctional—effects on other sources of influence. The findings rather strongly imply that management at least needs to question the wisdom of the removal of significant source(s) of supervisory influence—particularly those that are incentive based.

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# *A Causal Model of Turnover for Nurses*[1]

**JAMES L. PRICE**
**CHARLES W. MUELLER**
**University of Iowa**

***Longitudinal data on 1,091 registered nurses in seven hospitals were used to estimate a causal model of turnover in organizations. Total effects on turnover were found to be the greatest for four determinants: intent to stay, opportunity, general training, and job satisfaction. The relative importance of the determinants of turnover and the explanatory power of the model are presented and discussed.***

Interest in explaining employee turnover has long been a major concern of organizational scholars (Cornoy, 1957; Long, 1951). The works of Mayo (1924) and Slichter (1919) are illustrative of the earliest studies. Recently the literature on turnover has become voluminous, and studies may be categorized as one of two types. First, there is the literature that explicitly identifies turnover as the dependent variable to be explained (Bluedorn, 1976; Bowey, 1974; Burton & Parker, 1969; Clowes, 1972; Farris, 1971; Goodman, Salipante, & Paransky, 1973; Knowles, 1964; Lefkowitz, 1971; Martin, 1977; Pencavel, 1970; Pettman, 1973; Porter & Steers, 1973; Schoenherr & Greeley, 1974; Schuh, 1967; Stoikov & Raimon, 1968). Second, there are studies that treat turnover as a component of some more general phenomenon (such as job withdrawal) or depict it as but one of several dependent variables to be explained (Argyris, 1973; Katzell, Korman, & Levine, 1971; Lawler, 1973; Lyons, 1968; March & Simon, 1958; Vroom, 1964).

The major weakness of these various explanatory models probably is their lack of inclusiveness. The different models vary greatly in the variables they emphasize, and variables deemed of major importance in one

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model are not even cited in other studies. One reason for this is that multiple research traditions exist, each often largely ignoring the findings of the others. This lack of inclusiveness has made it impossible to assess accurately the relative importance of the various determinants of turnover.

Price's (1977) recent codification of the turnover literature is a step toward remedying this state of confusion. He provides a summary of the research findings on the determinants of turnover and thus allows scholars the opportunity to become aware of the generalizations (and the degree of support for them) that may be drawn from past research. He also offers a causal model, based on his synthesis of this literature, which depicts how the determinants operate to produce turnover. The major objective in the present paper is to estimate a slightly revised version of Price's causal model of turnover. Specifically, the goal is to assess the relative importance of the various determinants in the model and to determine the explanatory power of the model. It is important to emphasize that although a crucial test of various competing models of turnover perhaps would be desirable, this is not the objective. The causal model to be estimated represents a synthesis of various models and not a rival to them.

## THE CAUSAL MODEL

The dependent variable in the causal model is voluntary leaving from an organization (Price, 1977). Layoffs, dismissals, retirements, and deaths are excluded because they are types of involuntary leaving. In addition, transfers and promotions, because they take place within organizational boundaries, are not considered to be voluntary leaving. (To simplify the presentation, "turnover" henceforth will be substituted for "voluntary leaving.")

The turnover literature suggests that the following 11 determinants produce variations in turnover: opportunity, routinization, participation, instrumental communication, integration, pay, distributive justice, promotional opportunity, professionalism, general training, and kinship responsibility. Also suggested by the literature are two additional variables, job satisfaction and intent to stay, that are hypothesized here to intervene between the determinants and turnover. Definitions of these determinants and intervening variables are contained in Table 1.

The relationships in the causal model are depicted in Table 2 and Figure 1. Table 2 states the relationships in propositional form, whereas Figure 1 is a diagram of the propositions. As is apparent from the table and figure, alternative jobs outside the hospital serve to increase directly the amount of turnover. Seven determinants have an indirect impact on turnover through job satisfaction. Repetitive work decreases job satisfaction, whereas participating in job related decisions, being informed about job related issues, having close friends employed by the same organization, receiving good pay, being fairly compensated, having an opportunity to obtain a better job in the organization—all operate to increase job satisfaction. And as job satisfaction increases, individuals evidence greater intent

## TABLE 1
## Determinants and Intervening Variables: Definitions and Measures

| *Variable* | *Definition* | *No. of Items* | *Sample Items*[a] |
|---|---|---|---|
| Opportunity | The availability of alternative jobs in the organization's environment. | 4 | How easy would it be for *you* to find a nursing job with another employer? How would you describe the number of *available nursing jobs*, with all types of employers, for a nurse with your qualifications? |
| Routinization | The degree to which a job is repetitive. | 4 | To what extent are the activities that make up your job *routine*? How much *repetitiveness* is there in the activities that make up your job? |
| Participation | The degree of power that an individual exercises concerning the job. | 4 | For each of the following decisions, please indicate ***how much say you actually have*** in making these decisions: A. How you do your job; B. Sequence of your job activities; C. Speed at which you work; D. Changing how you do your job. |
| Instrumental communication | The degree to which information about the job is transmitted by an organization to its members. | 7 | How well *informed* are you about each of the following aspects of ***your job*** in the hospital? Priority of work to be done; technical knowledge; nature of equipment used. |
| Integration | The degree to which an individual has close friends among organizational members. | 4 | *While you are actually working*, how often do you see your close friends among hospital employees? How often do you see your close friends among hospital employees *during breaks*, such as for coffee and lunch? |
| Pay | The amount of money, or equivalents, distributed in return for service. | 1 | Total yearly income from nursing before taxes and other deductions are made. |
| Distributive justice | The degree to which rewards and punishments are related to the amount of input into the organization. | 3 | *Compared to the effort that you put into your job*, how do you feel about the pay you receive in the hospital? (a) Compared with the effort, my pay is very poor, (b) Poor, (c) About right, (d) Good, (e) Compared with the effort, my pay is very good. |
| Promotional opportunity | The amount of potential movement from lower to higher strata within an organization. | 8 | How much do you agree or disagree with each of the following statements about *promotional opportunities* for a person with your qualifications somewhere in the hospital? There is little chance to get ahead; There is a very good opportunity for advancement. |
| Professionalism | The degree of dedication to occupational standards of performance. | 3 | How many *memberships* do you have in *professional associations*, such as American Nurses' Association, Association of Operating Room Nurses, Critical Care Nurse Association, and so forth? How often do you generally *attend meetings* (district, state, and national) of a professional association? |

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[a] A complete description of the items used is available on request from the authors.

## TABLE 1 (cont.)
## Determinants and Intervening Variables: Definitions and Measures

| *Variable* | *Definition* | *No. of Items* | *Sample Items*[a] |
|---|---|---|---|
| General training | The degree to which the occupational socialization of an individual results in the ability to increase the productivity of different organizations. | 1 | How much *professional schooling in nursing* have you had? (a) Associate, (b) Diploma, (c) Baccalaureate, (d) Graduate degree(s). |
| Kinship responsibility | The degree of an individual's obligations to relatives in the community in which an employer is located. | 3 | Index based on marital status, presence of children, and importance given to being a good wife and mother. |
| Job satisfaction | The degree to which individuals like their jobs. | 7 | How much do you *agree* or *disagree* with each of the following statements about your job? I find real enjoyment in my job; I am fairly well satisfied with my job; I definitely dislike my job. |
| Intent to stay | The estimated likelihood of continued membership in an organization. | 2 | Which of the following statements most clearly reflects your feelings about your *future in the hospital*? (a) Definitely will not leave, (b) Probably will not leave, (c) Uncertain, (d) Probably will leave, (e) Definitely will leave. |

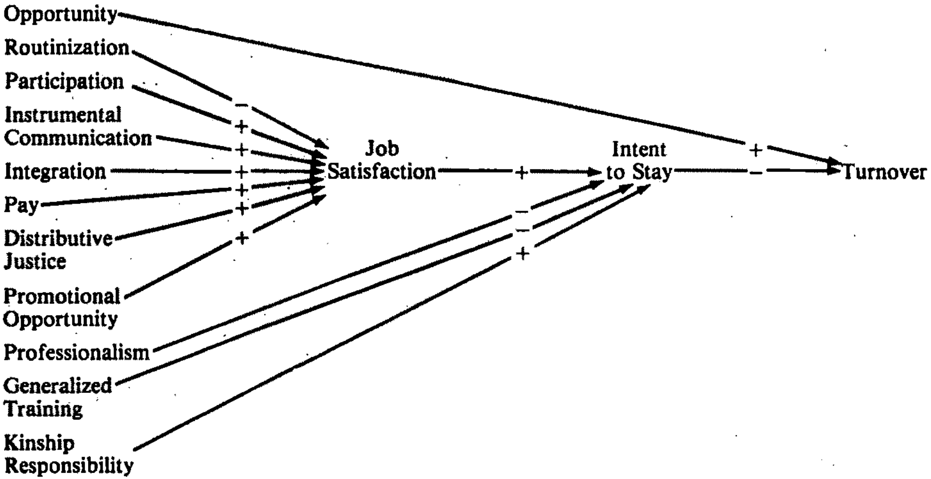
[a] A complete description of the items used is available on request from the authors.

## TABLE 2
## The Causal Model of Turnover

*Propositions*

1. Successively higher amounts of intent to stay will likely produce successively lower amounts of turnover.
2. Successively higher amounts of job satisfaction will likely produce successively higher amounts of intent to stay.
3. Successively higher amounts of opportunity will likely produce successively higher amounts of turnover.
4. Successively higher amounts of routinization will likely produce successively lower amounts of job satisfaction.
5. Successively higher amounts of participation will likely produce successively higher amounts of job satisfaction.
6. Successively higher amounts of instrumental communication will likely produce successively higher amounts of job satisfaction.
7. Successively higher amounts of integration will likely produce successively higher amounts of job satisfaction.
8. Successively higher amounts of pay will likely produce successively higher amounts of job satisfaction.
9. Successively higher amounts of distributive justice will likely produce successively higher amounts of job satisfaction.
10. Successively higher amounts of promotional opportunity will likely produce successively higher amounts of job satisfaction.
11. Successively higher amounts of professionalism will likely produce successively lower amounts of intent to stay.
12. Successively higher amounts of general training will likely produce successively lower amounts of intent to stay.
13. Successively higher amounts of kinship responsibility will likely produce successively higher amounts of intent to stay.

**FIGURE 1**
**The Causal Model of Turnover**



to stay with the organization. Three determinants have an indirect impact on turnover through intent to stay. Increased dedication to occupational standards of performance and general occupational socialization serve to decrease intent to stay, whereas obligations to local kin serve to increase intent to stay. Finally, the model indicates that intent to stay has a direct negative impact on turnover.

Inclusion of all the variables except general training, kinship responsibility, and intent to stay is based on Price's (1977) synthesis of the turnover literature. General training is added to the original Price model because of Becker's (1964) suggestions and Parsons' (1972) empirical study. Kinship responsibility was suggested in the demographic literature on migration (Long, 1972; Comay, 1972; Leslie & Richardson, 1961; Miller, 1976).

The major revision of the original Price model involves the addition of intent to stay as an intervening variable between job satisfaction and turnover. Intent to stay has been added to the model because of the recent work of Porter and his colleagues (Porter, Steers, Mowday, & Boulian, 1974; Steers, 1977; Porter, Crampton, & Smith, 1976; Koch & Steers, 1978), who view intent to stay as one dimension of "commitment." Mobley and his colleagues (Mobley, 1977; Mobley, Griffeth, Hand, & Meglino, 1979), in a careful review of the turnover literature, conclude that "the developing body of research on commitment" suggests it is "significantly and negatively related to turnover" (1979, p. 508). There also exists a growing body of literature supporting the relationship between intent to stay and turnover (Atchison & Lefferts, 1972; Hunter, 1962; Kraut, 1975; and Mangione, 1973).

None of the variables defined in Table 1 refers to "correlates," such as age, length of service, existence of a union, vested pension funds. Correlates (sometimes termed demographic variables) are not included in the model because they do not indicate the means whereby they produce variations in turnover. Age illustrates this. Quite a substantial literature (Price, 1977) supports a negative relationship between age and turnover: younger members usually have higher rates of turnover than do older members. Age, however, does not indicate *how* the younger age produces higher rates of turnover. An answer to the "how" question must be sought among the variables defined in Table 1. Younger members, for instance, have higher rates of turnover than older members because they—the younger members—usually have the most routine jobs, participate little in decision making, lack knowledge about their jobs, have fewer close friends, receive less pay, and have fewer local obligations to kin. In short, it is not age *per se* that produces variations in turnover, but routinization, participation, instrumental communication, integration, pay, and kinship responsibility, all of which are correlated with age.

The position taken here on correlates may seem trivial to some readers, but it is believed that it is an important distinction when the objective is explanation rather than prediction. If the researcher's goal is to arrive at a set of variables that maximally predict who will and who will not leave the organization, then the present authors would be the first to recommend the inclusion of variables such as age and length of service—in fact, any variable correlated with turnover should be included. However, if the goal is to explain turnover, that is, to indicate why those who are younger and those with short service records leave more often, one must look toward theoretically relevant constructs, such as those defined in Table 1. It is believed that turnover researchers have shown conclusively that age and length of service are good predictors of turnover. It is time to *explain* why they are.

The correlates, however, will not be totally ignored. A later section indicates how it is possible to make an indirect check of the model by estimating the influence of the correlates after the determinants have been included. The focus will be on three correlates in the analysis: age, length of service, and amount of time worked (whether full time or part time). Age and length of service are included because of their long-documented support in the turnover literature (Price, 1977). Amount of time worked is included because of the widespread belief that full time nurses are very different from part time nurses. In the present study, full time nurses work 40 hours per week, and most of the part time nurses work 16 hours each week.

As already indicated, the decision as to which variables were to be included in the model was based primarily on Price's (1977) codification of the literature. His assessment of the degree of empirical support was based on data about each variable's direct link with turnover or its indirect link through other variables (usually job satisfaction). The greatest amount of evidence supports the relationships involving the following six variables: opportunity, participation, instrumental communication, integration, pay, and job satisfaction. Opportunity and pay probably are the best supported of these six variables. A somewhat lesser amount of evidence supports the relationship involving the following four variables: routinization, distributive justice, promotional opportunity, and professionalism. Finally, there exists only limited evidence to support the relationships in which general training, kinship responsibility, and intent to stay are involved.

The linkages portrayed in Table 2 and Figure 1 are all one-way (a recursive model), are hypothesized to be either positive or negative, are probabilistic rather than deterministic, linear rather than nonlinear, and additive rather than nonadditive. The estimation procedures, described below, will allow for determining the magnitude and sign of the paths in the model.

The causal ordering of the variables comes from a review of existing models. Intent to stay only recently has been introduced into the study of turnover by Porter and his colleagues whose major argument is that commitment is a more important variable than job satisfaction. Intent to stay, as previously indicated, is one dimension of commitment. The recent work of Mobley (1977), however, explicitly presents a causal ordering of job satisfaction preceding commitment, and the work of Schoenherr and Greeley (1974) is strongly suggestive of this ordering. No literature suggests the opposite causal ordering, although the present authors are aware of possible reciprocal effects between these two variables.

Use of the label "causal model" is not intended to convey a high level of theoretical and methodological sophistication. The model developed is intended to be tentative and represents an attempt to construct a plausible synthesis of what is known about the variables that produce variations in turnover. What is to be estimated is a model very much in the process of being developed.

Two final comments about the model are necessary. First, some of the literature about turnover, especially that produced by social psychologists, emphasizes the importance of individual variation in the determinants of turnover (Lawler, 1971, 1973). This emphasis is especially prominent in discussions of pay. The argument is that pay is only a significant determinant of turnover if it is highly valued. When it is not highly valued, it ceases to have an important impact on turnover. Although this claim is not rejected, it is argued that there also are norms in the society that prescribe what all individuals should desire. It is assumed in this research that all of the determinants are of sufficient importance to motivate the behavior of the individuals studied.

Second, because of suggestions from hospital administrators, full time and part time nurses were expected to be at different mean levels on most of the variables in the model. There also exists the possibility that a causal model estimated for full time nurses is inappropriate for part time nurses, that is, the other variables may interact with this one. To assess this possibility, standard hierarchical significance tests were conducted for the interaction of amount of time worked with the major determinants of turnover. Statistically significant interactions were not found. Because of this, and because amount of time worked should be controlled for to assess accurately the influence of pay, this variable was included in the analysis and allowed to have an additive effect. As will be shown in the analysis, however, this variable has either a nonsignificant or very small net influence on nursing turnover.

## DATA AND METHODS

### Site

The site of this research is seven voluntary, short term, general hospitals. Using Becker and Newhauser's (1975) classification scheme, six of the seven hospitals are of medium size, that is, between 100-500 beds, and the seventh is slightly larger with 620 beds. Five of the hospitals are located in Iowa and two in Illinois. The three communities in which the seven hospitals are located are all medium size metropolitan communities between 50,000 and 250,000. All of the hospitals are church operated; four are Protestant and three are Catholic.

### Sample

The sample consists of 1,091 nonsupervisory, registered nurses. Nurses with three types of training are employed by the hospitals: associate ($N=140$), diploma ($N=770$), and baccalaureate-graduate ($N=174$). (The total $N$ does not sum to 1,091 because there are seven cases with missing data concerning type of training.) Both full time ($N=764$) and part time ($N=415$) nurses are included in the sample. (There are two missing cases for amount of time worked.)

### Data Collection

The collection of the data required a two step, longitudinal design. The researchers distributed questionnaires, mostly by mail, to the homes of 1,383 nurses in August 1976. The nurses were requested to return the completed questionnaires directly to the researchers rather than to the hospital administrators. A total of 1,101 questionnaires were returned: a response rate of 80 percent.

The second step involved determining who had left the hospitals and whether the turnover was voluntary or involuntary. In September 1977 each hospital—actually the nursing director and/or personnel officer—received a list of its nurses who had returned the questionnaires to the researchers. The hospital administrators were requested to indicate on the list the names of the nurses no longer employed by the hospitals as of October 1, 1977. From the list of the nurses no longer employed, the administrators were also requested to indicate the nurses who had died, retired, or were dismissed. One of the researchers visited each hospital in October 1977 to collect and cross check these data.

Between August 1976 and October 1977, 221 nurses (20 percent) had left the employment of the hospitals. Because this research is concerned only with voluntary separations, the 10 nurses (of the 221) who left involuntarily were dropped from the analysis. This results in an *N* of 1,091, for which the rate of voluntary separations is 19 percent. (As a check for possible bias introduced by not obtaining questionnaire data on all nurses, the turnover rate was computed for those nurses who had not returned questionnaires. This computation was possible because of use of hospital records to measure turnover. Their rate was .28, suggesting limited, if any, bias associated with not including these nurses.)

## Measurement

Turnover, the dependent variable in the study, is a dichotomy in which leavers are coded 1 and stayers coded 0. This information was obtained in the manner described in the preceding paragraph.

The items used in the questionnaire came primarily from Nadler (1975) and Price (1972) and were pretested in the pilot study (Price & Bluedorn, 1979) for this research. The items designed to measure each construct were factor analyzed (i.e., a separate factor analysis for the items for each construct) to assess unidimensionality, with only the items having loadings greater than .40 being retained. The items for each construct were then summed to form what are called "factor-based composites" (Kim & Mueller, 1978). Cronbach's alpha was then computed as a measure of reliability for each composite. However, because the pilot study was based on only one hospital, these steps were repeated on the data from the current study, and with the exception of a few loadings falling below the .40 criterion, the findings about unidimensionality and reliability were replicated. The Cronbach's alphas based on the current data for these multiple item measures are as follows: opportunity (.75), routinization (.82), participation (.86), instrumental communication (.90), integration (.84), distributive justice (.76), promotional opportunity (.93), professionalism (.74), job satisfaction (.87), and intent to stay (.85). None of the reliabilities falls below .70, and their average is .83. Finally, it is assumed, but it cannot be demonstrated with the available data, that the perceptual measures used of the organizational and environmental characteristics are highly correlated with the actual characteristics.

## Analysis Strategy

Multiple regression analysis and path analysis were used to estimate the parameters of the total model. Although multiple regression requires a continuous dependent variable, its robustness when dichotomies are used, as in this study, is well understood (Knoke, 1975; Goodman, 1976; Gillespie, 1977) and its use can be justified.

Path analysis is a statistical technique that allows for estimating direct and indirect effects for a system of variables for which the causal ordering is known (Duncan, 1966; Land, 1969; Asher, 1976). In particular, the technique allows for obtaining estimates of the paths in the model in Figure 1. Because this is a recursive model, ordinary least squares regression analysis can be used to obtain the path estimates, which are standardized partial regression coefficients (commonly called "betas"). The total effect of each variable causally prior to turnover can be decomposed into a direct effect and an indirect effect through variables (job satisfaction and intent to stay) that intervene between it and turnover.

Although the sample is not a random one, significance tests primarily will be relied on in order to avoid making arbitrary decisions about the importance of variables in the model. Missing values constitute no serious problem in the analysis. The average missing cases for the 13 variables is 2 percent, the highest being 4 percent for promotional opportunity. (There are no missing values for turnover.) The pairwise deletion option is used in the analysis.

The results to be reported in the following section are based on the use of a matrix of correlations that have not been corrected for unreliability. Because reliability estimates were available for most of the variables in the analysis, a corrected matrix was created and the analyses run to determine if the conclusions would be different. These corrected data have not been reported because only minor differences between the uncorrected and corrected results were found, and using corrected correlations is not always appropriate, especially when one is interested in comparing the amount of explained variance with other studies (Kim & Mueller, 1978).

## RESULTS

Table 3 displays the zero-order correlations among all of the variables in the model. With only a few exceptions, the magnitudes of these correlations fall within what could be called the small to moderate range. From this it may be concluded, first, and positively, that the determinants are largely independent of each other and, second, but negatively, that most of the determinants are not strongly related to turnover. Thus, it can be expected that the influence of the various determinants on turnover is relatively independent of each other, but this influence should not be very strong. Table 3 also shows the means and standard deviations for these variables.

Table 4 presents the regression results used to estimate the model depicted in Table 2 and Figure 1. Note that 11 regression models have been estimated. The betas represent the path coefficients and thus give information about the paths from the determinants to the dependent variable for a particular equation. The procedure followed involves using a series of regression models to estimate the effects of determinants on job satisfaction, the effects of determinants and job satisfaction on intent to stay, and, finally, the effects of determinants, job satisfaction, and intent to stay on

## TABLE 3
## Correlation Matrix for all Variables: Total Sample[a]

| | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* | *14* | *15* | *16* | *17* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | — | | | | | | | | | | | | | | | | |
| 2. | -.404 | — | | | | | | | | | | | | | | | |
| 3. | -.121 | .300 | — | | | | | | | | | | | | | | |
| 4. | .187 | -.169 | -.031 | — | | | | | | | | | | | | | |
| 5. | .005 | -.063 | -.374 | -.039 | — | | | | | | | | | | | | |
| 6. | -.044 | .117 | .238 | .139 | -.130 | — | | | | | | | | | | | |
| 7. | -.074 | .145 | .293 | .056 | -.108 | .313 | — | | | | | | | | | | |
| 8. | -.011 | .035 | .060 | .014 | -.072 | .074 | .089 | — | | | | | | | | | |
| 9. | .017 | -.007 | -.072 | .063 | .047 | .016 | .076 | .167 | — | | | | | | | | |
| 10. | -.025 | .046 | .060 | -.033 | -.039 | -.046 | -.003 | .008 | -.044 | — | | | | | | | |
| 11. | -.022 | .102 | .269 | .086 | -.188 | .159 | .128 | .024 | -.045 | .163 | — | | | | | | |
| 12. | .003 | .022 | .004 | .060 | -.126 | .011 | .052 | .125 | .142 | -.068 | -.021 | — | | | | | |
| 13. | .180 | -.257 | -.015 | .191 | -.016 | -.003 | -.095 | -.032 | .136 | -.025 | .020 | -.010 | — | | | | |
| 14. | -.110 | .229 | .103 | -.132 | -.002 | -.002 | .015 | -.171 | -.361 | .025 | -.029 | -.066 | -.292 | — | | | |
| 15. | .010 | -.058 | -.121 | .069 | .043 | -.002 | .011 | .178 | .781 | -.084 | -.023 | .105 | .151 | -.437 | — | | |
| 16. | -.190 | .287 | .123 | -.172 | .046 | .028 | .140 | -.176 | -.110 | -.024 | -.008 | .034 | -.235 | .351 | -.191 | — | |
| 17. | -.223 | .355 | .074 | -.226 | -.018 | .051 | .161 | -.007 | -.109 | .001 | -.076 | .016 | -.341 | .329 | -.206 | .596 | — |
| Mean | .19 | 6.39 | 28.26 | 11.40 | 11.93 | 13.89 | 26.37 | 8.52 | 8455.0 | 7.01 | 21.62 | 1.79 | 1.45 | 4.88 | .62 | 31.56 | 3.10 |
| Std. Dev. | .40 | 2.05 | 4.03 | 2.70 | 2.92 | 3.46 | 5.04 | 5.28 | 3027.0 | 1.63 | 6.07 | 1.36 | .75 | 1.34 | .49 | 10.63 | 1.29 |

[a] Pairwise *Ns* used to compute the correlations range from 1010 to 1091. 1 = Turnover; 2 = Intent to stay; 3 = Job satisfaction; 4 = Opportunity; 5 = Routinization; 6 = Participation; 7 = Instrumental communication; 8 = Integration; 9 = Pay; 10 = Distributive justice; 11 = Promotional opportunity; 12 = Professionalism; 13 = General training; 14 = Kinship responsibility; 15 = Amount of time worked; 16 = Age; 17 = Length of service.

## TABLE 4
## Regression Results (Standardized Coefficients) for Turnover, Intent to Stay, and Job Satisfaction as Dependent Variables for Total Sample

| | *Job Satisfaction* | | | *Intent to Stay* | | | *Turnover* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Independent Variables* | *(1)* | *(2)* | *(3)* | *(4)* | *(5)* | *(6)* | *(7)* | *(8)* | *(9)* | *(10)* | *(11)* |
| Opportunity | -.08** | -.07* | -.06* | -.12*** | -.08** | -.08*** | .17*** | .16*** | .12*** | .11*** | .11*** |
| Routinization | -.31*** | -.31*** | -.31*** | .05 | .05 | | -.00 | -.04 | -.02 | -.02 | |
| Participation | .12*** | -.12*** | .11*** | .06 | -.05 | | -.05 | -.04 | -.01 | .01 | |
| Instrumental communication | .21*** | .20*** | .19*** | .02 | -.01 | | -.05 | -.03 | -.02 | -.01 | |
| Integration | .04 | .06* | .04 | .02 | .03 | | -.00 | .00 | .01 | .00 | |
| Pay | .04 | .04 | | .09* | .06 | .11*** | .02 | .03 | .06 | .07 | |
| Distributive justice | .01 | .02 | | .02 | .03 | | -.02 | -.02 | -.01 | -.01 | |
| Promotional opportunity | .17*** | .16*** | .17*** | .05 | .06* | .07* | -.02 | -.01 | .01 | .01 | |
| Professionalism | -.03 | -.04 | | .03 | .02 | | -.00 | -.01 | .00 | .01 | |
| General training | .05 | .05 | | -.19*** | -.13*** | -.14*** | .13*** | .13*** | .06* | .05 | .06* |
| Kinship responsibility | .08* | .06 | | .17*** | .11*** | .11*** | -.07* | -.06 | -.00 | .02 | |
| Amount of time worked | -.11* | -.11* | -.09** | .01 | .05 | | -.07 | -.08 | -.08 | -.09 | |
| Job satisfaction | | | | .26*** | .26*** | .25*** | | -.11** | -.01 | -.01 | |
| Intent to stay | | | | | | | | | -.37*** | -.35*** | -.37*** |
| Age | | .12*** | .09** | | .06 | | | | | -.05 | |
| Length of service | | -.07 | | | .26*** | .25*** | | | | -.05 | |
| $\bar{R}^2$ | .26 | .27 | .26 | .19 | .24 | .24 | .06 | .07 | .17 | .18 | .18 |

*$p < .05$
**$p < .01$
***$p < .001$

turnover. Followed was the convention in path analysis of estimating all one-way paths implied in the model (a fully recursive model) regardless of whether they are hypothesized to be present. If a path hypothesized to be absent is found to be nonsignificant, this is interpreted as support for the hypothesis. Models 1-3 identify job satisfaction as the dependent variable. A comparison of equations 1 and 2 will allow a determination of whether, with the other variables, the influence that the correlates age and length of service have on job satisfaction has been explained. Equation 3 excludes the variables that were not significant in equation 2. Models 4-6 provide the same information when intent to stay is the dependent variable. Models 7-11 are all for turnover as the dependent variable. As will be described below, these additional equations are used not only to obtain path estimates for the causal model, but may also be used to make empirical statements about the importance of job satisfaction and intent to stay as intervening variables in the causal process.

Seven variables are found to have a statistically significant influence on *job satisfaction* (column 3 of Table 4). (When all variables are included in the equation, integration just barely reaches significance. See column 2 of Table 4. It falls below statistical significance when only the significant variables are included, however. See column 3.) The strongest influence is for routinization, with instrumental communication and promotional opportunity also being relatively important. Participation, which was also expected to influence satisfaction, is significant, but its influence is not large. From these findings one learns that low routinization, high instrumental communication, high promotional opportunity, and high participation in decision making all contribute to greater job satisfaction. Two variables, integration and distributive justice, which were expected to have a net effect, are not significant, and opportunity is just significant, even though the literature has not suggested its importance. In addition, both amount of time worked and age have weak but statistically significant effects. These unexpected net effects indicate that the greater the opportunity, the less the job satisfaction; the older the nurse, the greater the job satisfaction; and full time nurses are less satisfied than part time nurses. The amount of variance explained (adjusted) for job satisfaction is 26 percent.

When *intent to stay* is the dependent variable, 24 percent of the variance is explained and seven variables have significant net effects. (Although pay was not significant in equation 5, it was found to be significant in the equation with the other nonsignificant variables removed. See column 6 of Table 4.) As expected, job satisfaction has the strongest influence: the more satisfied nurses are the ones who intend to stay. Also, as expected, nurses with the most general training, that is, with baccalaureate and graduate degrees, are more likely to expect to leave and nurses with greater kinship responsibilities are the least likely to express an intent to leave. Although pay had been expected to have an influence only indirectly through job satisfaction, it was found that nurses with the highest pay are more likely to express an intent to stay, regardless of their level of job satisfaction. Opportunity and promotional opportunity also have a significant influence on intent. Although not explicitly specified by the model, it is not surprising that those nurses who perceive the greatest employment opportunities outside the hospital and perceive limited promotional opportunities within the hospital are also the ones who are least likely to plan to stay in the hospital. Professionalism was expected to have a direct effect on intent to stay; however, this variable is not important in any part of the model. Finally, net of these other variables, it is the nurses with the longest tenure who intend to stay in the hospital.

The explained variance for *turnover* is 18 percent, with only three variables having significant direct effects on it. See column 11 of Table 4. General training just reaches statistical significance when the numerous nonsignificant variables are excluded. The major determinant is intent to stay, with opportunity having a much smaller net effect, and general training have a very small net effect. In brief, those who have the least general training (associate degrees or diplomas), perceive more limited opportunity, and intend to stay are the most likely not to leave the hospital. This net effect of general training had not been anticipated but, given its small magnitude, it is not viewed as a substantively important determinant.

In sum, the model hypothesized in Figure 1 receives mixed support: four of the seven hypothesized direct effects on job satisfaction are significant, and one not hypothesized is significant; three of the four hypothesized direct paths to intent to stay are significant, and one not hypothesized is significant; both hypothesized direct paths to turnover are significant, with one additional variable having a weak direct effect; only one of the three correlates, all of which were expected to have little influence, was found to be of much importance.

The examination of these direct effects is only part of the information available from a path model and by itself can sometimes be misleading. As already discussed, one of the major arguments appearing in the recent turnover literature is that the organizational characteristics produce varying levels of job satisfaction, which, in turn, influence the person's intent to stay in the organization, which, in turn, is the major direct determinant of turnover. In short, there are expected indirect effects that must be examined.

An overall estimate of indirect effects may be obtained by computing various sheaf coefficients for the exogenous determinants—the variables causally prior to job satisfaction and intent to stay—as a block of variables. As described by Heise (1972), the sheaf coefficient is comparable to a path coefficient but is unique because it represents the combined influence of a set of several variables. The total causal influence of the statistically significant exogenous determinants is .26 and is obtained by computing the sheaf coefficient for turnover regressed only on these variables. The total net (unmediated) effect of these same determinants is .15, which is the sheaf coefficient after controlling for job satisfaction and intent to stay. The total net effect, controlling only for job satisfaction, is .25. From this information it can be stated that 3.8 percent $(1-\frac{.25}{.26})$ of the total causal influence of the significant determinants operates through job satisfaction, 38.5 percent ($\frac{.25-.15}{.26}$) operates through intent to stay, and 57.7 percent ($\frac{.15}{.26}$) of the total effect of these determinants is direct (unmediated by job satisfaction, intent to stay, or both). Thus, the importance of intent to stay, rather than job satisfaction, as an intervening variable is demonstrated.

The importance of intent to stay in the model is not just its significance as an intervening variable, however. First, it contributes significantly to the explained variation in turnover. As may be seen by comparing column 8 with column 9 in Table 4, its net contribution is 10 percent. Second, excluding intent to stay from the model results in concluding that job satisfaction is more important than it actually is (compare the coefficient for satisfaction in the same two equations).

One of the objectives was to draw some inferences about the relative importance of the various determinants of turnover that have been identified as important in the literature. An examination of the net effects (Table 4, columns 10 and 11) is informative but incomplete for this purpose. Because the turnover model includes two intervening variables, it is possible to identify the total causal effect of each variable. In particular, three types of variables can be identified: (1) those having only direct effects (intent to stay), (2) those having both direct and indirect effects (opportunity and general training), and (3) those having only indirect effects (all the other determinants). Following procedures recommended by Alwin and Hauser (1975), the direct and indirect effects that the statistically significant determinants have on turnover (see Table 5) were computed. Computing total effects as the sum of both direct and indirect effects, the rank ordering of the variables is as follows: intent to stay (–.37), opportunity (.15), general training (.11), and job satisfaction (–.09). All other determinants had total effects of less than .05.

As discussed above, amount of time worked, length of service, and age were not expected to be important determinants of turnover because the other variables in the model were supposed to indicate what it is about these correlates that influences the amount of turnover. Length of service, however, turns out to have an indirect influence through intent to stay, which produces a total effect of –.09. It also is noted that the net influence of these correlates is similar in magnitude to the total influence of job satisfaction. The sheaf coefficient for the net combined influence of the three correlates is .10.

To simplify the discussion that follows, variables whose total effects are less than .05 will be arbitrarily ignored. Total effects of these magnitudes will be considered as too small to be meaningful. Of course, a differentiation among the variables with effects above this cut-off is needed—there are large differences in the magnitude of these effects.

### TABLE 5
### Direct, Indirect, and Total Effects of Determinants and Correlates on Turnover[a]

| | | *Indirect Effects Via* | | | |
|---|---|---|---|---|---|
| *Determinants and Correlates* | *Direct Effects* | *Job Satisfaction* | *Intent to Stay* | *Job Satisfaction and Intent to Stay* | *Total Effects* |
| Intent to stay | -.37 | | — | — | -.37 |
| Job satisfaction | | — | -.09 | — | -.09 |
| Opportunity | .11 | | .03 | .01 | .15 |
| Routinization | | | | .03 | .03 |
| Participation | | | | -.01 | -.01 |
| Instrumental communication | | | | -.02 | -.02 |
| Pay | | | -.04 | | -.04 |
| Promotional opportunity | | | -.03 | -.02 | -.05 |
| General training | .06 | | .05 | | .11 |
| Kinship responsibility | | | -.04 | | -.04 |
| Amount of time worked | | | | -.01 | -.01 |
| Age | | | | .01 | .01 |
| Length of service | | | -.09 | | -.09 |

[a] Integration, distributive justice, and professionalism are excluded from the table because they did not have significant direct or indirect effects.

## DISCUSSION

The revised turnover model based on the work of Price (1977) received mixed support in the present research. Both positive and negative findings are summarized below and their implications briefly discussed.

Intent to stay, a dimension of commitment, was found to have the largest total impact on turnover. This supports the contention of Porter and his colleages who have argued that commitment is more important than job satisfaction.

Opportunity was the second most important determinant, again in terms of total effects. Four comments about opportunity are pertinent. (1) The two most widely supported determinants in the literature probably are opportunity and pay; yet when both determinants are estimated in a comprehensive causal model, opportunity is almost four times as important as pay. (The pay variable is further discussed in the conclusions section.) These results demonstrate the value of multivariate analysis with a comprehensive model. (2) The importance of opportunity derives from the fact that it has both direct (.11) and indirect (.04) effects on turnover. The direct effects were expected, but not the indirect effects. The direct effect of opportunity is stressed in the literature; however, only Bluedorn (1976) and Martin (1977) have emphasized and estimated indirect effects for opportunity. (3) Opportunity is an environmental determinant whose importance supports the recent stress on this type of variable by organizational scholars (Pfeffer & Salancik, 1978; Aldrich, 1979). Explanation of turnover must focus on both environmental and organizational determinants. (4) The findings about opportunity provide marginal support for

March and Simon (1958) who argued that it is the most important determinant of turnover.

The results for general training—the third most important determinant—support the work of Becker (1964) and Parsons (1972). What is especially interesting, however, is that general training has both direct (.06) and indirect (.05) effects on turnover. The indirect effects were expected, but not the direct effects. A virtue of path analysis is that it allows for examining both direct and indirect effects of the determinants, a virtue previously demonstrated for opportunity.

Job satisfaction, one of the variables given considerable attention in the literature as an important determinant and as an intervening variable, was found to have no significant net influence on turnover. It was found, however, to serve as an important mediating variable between the other determinants and turnover—thus its fairly large total effect. The results for job satisfaction support the work of Mobley and his colleagues (1977, 1979), who have explicitly postulated an indirect impact of job satisfaction on turnover through commitment. Traditionally, it has been argued that job satisfaction has a direct, though weak, negative impact on turnover.

As should be apparent by now, both economic and noneconomic determinants are important in explaining variation in turnover. Opportunity and general training—variables stressed by economists—turn out to be significant, as are intent to stay and job satisfaction—variables stressed by sociologists and social psychologists. These findings caution against narrow disciplinary research into the determinants of turnover.

The remaining determinants either had total effects too small to be meaningful (pay, kinship responsibility, routinization, instrumental communication, promotional opportunity, and participation) or had no total effects at all (integration, distributive justice, and professionalism). Four comments are pertinent regarding these determinants. (1) There is a substantial literature supporting the influence of pay, instrumental communication, participation, and integration. Much less literature supports kinship responsibility, routinization, promotional opportunity, distributive justice, and professionalism—yet these determinants are as important as the four much better supported ones. Again, this result could only be obtained by multivariate analysis with a comprehensive model of turnover. (2) Although pay, kinship responsibility, routinization, instrumental communication, promotional opportunity, and participation had small total effects, they did have an impact on turnover through the intervening variables of job satisfaction and intent to stay. The value of using path analysis again is apparent here. If only the net effects had been examined, one would have concluded that these determinants had no influence on turnover, whereas in fact they had indirect effects. (What is true for these five determinants is also true for general training.) (3) A further point to be stressed on pay and opportunity pertains to the importance of pay for professional employees. Some scholars (Lyons, 1968; McGee, 1971; National Opinion Research Center, 1972) de-emphasize the importance of pay for professional employees, whereas others (Blau, 1974) place relatively more stress on the motive power of pay for professional employees. The results of the present research support those who de-emphasize the value of pay for professional employees. Nurses are professional employees, and the total effect of pay for these nurses is not large enough to be meaningful. (4) None of these variables as yet should be discarded as possible determinants of turnover. Although the measurement used appears to be generally adequate, important components of these determinants may not have been tapped. Some measurement improvements are suggested in the concluding section.

Length of service, although not a theoretical construct, was found to have a strong significant net influence on intent to stay, but not on turnover or job satisfaction. This is interpreted to mean that the determinants of intent to stay that are correlated with length of service have not been identified adequately. This is not surprising. The research was initiated without a full awareness of the theoretical or empirical importance of intent to stay.

The present research also is concerned with explaining as much as possible of the variation in turnover. The explained variance (adjusted) is 18 percent. This is lower than the 23 percent cited in Mobley et al.'s (1979) general review of the literature, but it is close to the 20 percent obtained in Sloan's (1975, 1978) study of nursing turnover. Given the present comprehensive causal model, a higher explained variance was desired. Suggestions concerning ways to increase the explained variance will be presented in the concluding section.

## CONCLUSIONS

The results of this research have been extensively summarized as they were discussed. Thus the paper will conclude with eight suggestions for further research on the determinants of turnover. The first two suggestions are theoretical. The remaining six pertain to data and methods.

(1) Intent to stay should be replaced by "commitment" conceptualized as "loyalty toward the organization." Porter and his colleagues (Mowday, Steers, & Porter, 1979) view commitment as consisting of three components: a strong belief in and acceptance of the organization's goals and values; a willingness to exert considerable effort on behalf of the organization; and a strong desire to maintain membership in the organization. The "intent to stay" used in the present study corresponds to their third component. It is suggested that each of the components of commitment is part of what is typically meant by "loyalty toward the organization." Loyalty is a more abstract way to refer to the three components and thus is a more parsimonious way to conceptualize commitment.

(2) Size of organization should be included in the causal model. Some research indicates that increased size reduces turnover because it results in more pay, provides more opportunity for promotion, and increases the

extent of participation. Other research suggests that increased size results in more turnover because it produces greater routinization. Still other research, possibly because of better control of extraneous variables, finds no relationship between size and turnover. Material pertinent to the relationship between size and turnover is found in Price (1977). The influence of size could not be estimated in the research reported in this paper because all of the hospitals studied were basically of medium size. Future research thus will need to include organizations that vary by size.

(3) Some of the organizations studied should be located in large urban areas where turnover rates are considerably higher (Moffatt & Hill, 1970). Although the turnover rate for the nurses in the hospitals was fairly high (19 percent), a larger rate is preferred. Certain variables, such as opportunity, for example, might operate to have a stronger influence in these larger communities.

(4) Males and females should be included in future research. Some of the variables in the model—integration, pay, promotional opportunity, professionalism, and kinship responsibility are possible examples—may have effects on turnover that differ by sex, and this possibility can be studied by including both males and females in the sample. Of special concern is that the impact of pay may be low because most of the nurses in the present sample are females who are not primary wage earners. (The questionnaire allows a check as to whether or not the respondents are primary wage earners.) In addition, even with the current ideological and legal support for women's rights, the cultural norm still exists that prescribes that the wife leave her job when the husband finds employment in another community. The absence of variables in the model that directly tap this contingency also probably reduces the amount of explained variance.

(5) Occupations that differ considerably in the extent of professionalism should be selected for study. The nurses in the present sample turned out to be very low in professionalism—thus professionalism may not have had the expected effects. If all hospital personnel, for example, were studied, the dispersion on the professionalism variable would be considerably larger, and if professionalism is really an important determinant, the results would so indicate. It also should be noted that the definition of professionalism used here—the degree of dedication to occupational standards of performance—is narrower than that used in much research on this topic (Snizek, 1972). A broader definition might find professionalism to be a more important determinant of turnover.

(6) Further research should shorten the period between data collection for the independent variables and data collection for turnover. It may be recalled that the data for the independent variables (including job satisfaction and intent to stay) were collected in August 1976, and data for turnover were collected in October 1977. Quite a few changes probably occurred in the 14 months that elapsed between data collection for the independent and dependent variables. It is likely that these changes would be reduced if the time span between data collections were shortened, thereby

increasing the explained variance. A 6-month interval probably would be appropriate. Such a short period of data collection would, of course, require a quite high rate of turnover—thus the third suggestion about selecting sites in large urban areas. The explained variance should increase with a shorter time period.

(7) Measurement improvements should be made for turnover, intent to stay, pay, distributive justice, professionalism, and integration. In the present study, turnover was measured as a dichotomous variable because the nurses were classified as either leavers or stayers. It is possible to make turnover a continuous variable by recording the amount of time spent with the organization after the independent variables are measured. If, for example, 12 months elapse between measurement of the independent and dependent variables, all the stayers could be scored as 12 and the leavers could be scored by the number of months (or fraction thereof) they remained with the organization after measurement of the independent variables. The scores for the leavers would run from 1 through 11. Turnover as a continuous variable would also allow for longer periods between data collection for the independent and dependent variables (see the sixth suggestion).

If intent to stay is viewed as part of commitment, as suggested, the expanded concept should be measured by a new measure developed by Porter and his colleagues (Mowday et al., 1979). In the present study, pay was considered as direct monetary income, thus fringe benefits, a significant component of pay, were ignored. In addition, pay, measured as the "total yearly income from nursing," should be measured as a wage rate, that is hourly wages. This would allow for a more complete and accurate assessment of any differences between full time and part time nurses. Bognanno, Hixson, and Jeffers (1974) show, for example, that higher pay rates operate to encourage nurses to work on a part time basis and not terminate employment. Thus, it is likely that in the present study the part time nurses are measured as receiving low yearly pay when, in fact, their pay rates may be higher than that of full time nurses. (An anonymous reviewer is thanked for pointing out this flaw in the measure of pay used.) The measure of distributive justice examined only the relationship between pay and performance, thus ignoring rewards other than pay, such as recognition and the allocation of physical facilities (such as scarce office space). With professionalism, dedication to occupational standards of performance was measured by various types of participation in professional associations—measures that may not fully gauge the dedication of interest here. More direct measures of dedication need to be developed. Finally, integration was measured by the existence of close friends in the hospital. What may be most important are close friends in the immediate work group.

(8) Some difficulty in establishing the causal ordering of satisfaction and intent to stay was encountered. Because the data used to measure both

of these variables were collected at one given time, uncontestable demonstration of the causal order for these variables is not possible. A similar problem exists for the variables that were hypothesized to influence job satisfaction and intent to stay. Future estimations of the model require greater use of longitudinal designs to assess causal ordering more accurately.

Implementation of these eight suggestions should increase the ability to explain the process of turnover and improve the explanatory power of the model.

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# *Plateaued Versus Nonplateaued Managers: Career Patterns, Attitudes, and Path Potential*[1]

**JOHN F. VEIGA**
**University of Connecticut**

*This study compared both effectively and ineffectively plateaued managers with nonplateaued managers by investigating (1) career movement histories, (2) career attitudes central to a plateaued career, and (3) career path potential in the organization. Among other results, significant differences were found between plateaus and nonplateaus in the timing of their mobility events and the types of moves they made.*

The notion of plateau primarily describes an individual's present career movement status within a particular organization. In recent years the career plateau phenomenon has begun to receive some attention (Connor & Fielden, 1973; Ference, 1978; Ference, Stoner, & Warren, 1977; Kay, 1974; Warren, Ference, & Stoner, 1975). In the more popularized work of Peter (1972) and Peter and Hull (1969), the plateaued manager is portrayed in a negativistic way. However, as Ference (1978) and others have pointed out, there is nothing inherently negative about the phenomenon.

Conceptually, a plateau has been defined as the point in one's career at which the likelihood of additional hierarchical promotion is very low (Ference et al., 1977). In practice, managers define plateau as the point at which future career mobility, including both upward and lateral moves, is in reasonable doubt because the length of time in the present position has been unduly prolonged (Veiga, 1981). The primary reason for this difference is, in part, because managers have difficulty differentiating upward and lateral movement (Veiga, 1981; Goldner, 1965) and, in part, because managers equate plateauing with cessation of movement. In this study, the latter definition will be primarily emphasized.

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Other than the Stoner, Ference, Warren, and Christensen (1974) study, in which 55 senior executives were interviewed, little empirical research has been done on career plateaus. In addition, Rosenbaum has argued that "little research has been done on the timing of mobility events" (1979, p. 238). Therefore, the major purpose of the present research was to investigate the timing of mobility events of managers whose careers have reached a plateau by comparing their career movement histories to those of a nonplateaued control group.

Owing in part to the negative stereotype presented by some writers (Peter & Hull, 1969), plateaued managers often are portrayed as possessing career attitudes in sharp contrast to those of the more glamorized mobile manager (Jennings, 1970, 1971a, 1971b; Maccoby, 1976). For example, mobiles are characterized as being impatient with career progress—plateaus have presumably stopped caring or, at least, are more willing to wait. Mobiles express more confidence in their market value and are ready to leave if opportunity knocks. Plateaus, the eternal pessimists, have long since decided to stay put. Although there are numerous attitudinal factors that might potentially differentiate the mobile manager from his plateaued counterpart, an objective of this research was to investigate only those career attitudes that seemed to be central to a plateaued career including: fear of stagnation, career impatience, marketability, and propensity to leave. In addition, although some research has shown a relationship between satisfaction and tenure (Gibson & Klein, 1970; Herzberg, 1957; Hulin & Smith, 1965), there is some question about whether a manager's career status moderates such effects. Therefore, this research also sought to investigate sources of job satisfaction and dissatisfaction that differentiate the plateaus and their counterparts.

A considerable amount of research has focused on the interconnectedness between mobility and movement path. However, most of this research has relied heavily on Markov models to analyze historical affects of career paths on subsequent moves from a probabilistic-modeled perspective (Ginsberg, 1971; Goodman, 1961; McFarland, 1970; McGinnis, 1968; Sorensen, 1975). To date, little research has focused on whether or not a particular career path in an organization provides greater potential for future mobility than does another path. Hence, an objective of this research was to compare the career path potential of plateaued managers with that of nonplateaued managers. To assess career path potential, three measures were used: elasticity (which measures relative promise of future mobility based on predecessor's experience), level of exposure/visibility, and the number of career opportunities available.

## METHOD

### Subjects and Procedure

A total of 1,733 managers up to the level of vice-president from 3 large manufacturing companies completed a lengthy career history and career attitude survey. The three corporations were selected because they were all in the same industry and were of comparable size—each employed over 100,000 people. Each company had between 530 and 600 people in middle management, and all were surveyed. The usable response was 1,243, or a 72 percent rate of return. Out of this initial data base, plateaued managers were selected based on two criteria: age and tenure in present position. Although there is no hard evidence to support the existence or nonexistence of plateaued managers before the age of 40, based on other career related studies (Gould, 1978; Levinson, 1978; Sofer, 1970; Veiga, 1973) it was felt that most careers are still in the formation stages until then. Moreover, Levinson, Darrow, Klein, Levinson, and McKee (1974) and Hall (1976) have elaborated models of stages in career development that establish a period of potential growth, maintenance, or stagnation beginning around 40 to 45 years of age. Hence, only managers aged 40 or over were included in this study.

Examination of career histories revealed that the average manager in this study spent 3.5 years per position—with less than one in four managers staying seven years or longer in a position. Using this data as a guideline, it was decided to classify subjects as plateaued if their tenure in their present position was equal to, or greater than, seven years. Although some have suggested that plateaued individuals represent the largest group in most organizations (Ference et al., 1977), the data gathered on middle management career mobility indicates that this may be overstated for managerial populations. These data suggest that close to 50 percent of all middle managers move frequently enough to be undefinable as plateaued.

Using the above criteria, 244 managers were classified as plateaued and, following the model of Ference et al. (1977), they were subdivided further into a "deadwood" group (the ineffective plateaus) and a "solid citizens" group (the effective plateaus) using, as a benchmark, average percentage increase in salary received during the last 12 months for all respondents. Deadwood received below average increases, and solids received above average increases. Although pay increases do not always reflect the true performance of those who receive them, in this case the pay increase distribution was so strikingly bimodal that there was little doubt that those who received below average increases were distinctly substandard in performance. The nonplateaued control group composed of 705 managers (40 years of age and older, with less than 7 years tenure in their present position) was not subdivided into "learners" and "stars" as suggested by the Ference et al. model (1977) because of the difficulties they report in determining who the learners are and because learners are likely to be under 40 years of age, such that their inclusion would have affected the validity of the control group.

All three groups were similar on demographic factors including: marital status (93 percent married), family size (2.6 children), level of education (all were college educated), and areas of specialization (the largest area for each group was marketing and sales, which represented 24 percent of the sample). Their ages ranged from 40 to 64 with the deadwood averaging 54, the solids 53, and the control group 50 years of age. Because the companies surveyed were sensitive about publishing detailed salary information, only comparative data on differences between each group were permitted to be published. The solids earned, on average, $3,000 more per year than the deadwood and the same average salary as the control group. During the year preceding the survey, the solids received an average annual increase of 7.7 percent, the control group received 6.1 percent, and the deadwood received 2.4 percent.

The plateaus' tenure in present position ranged from 7 to 30 years; $\overline{X}=11.51$ years, *s.d.* $=7.9$. No differences in tenure were found between solids and deadwood. The control group's tenure in present position ranged from 1 to 6.5 years; $\overline{X}=3.9$ years, *s.d.* $=2.8$. Plateaus, on average, were 45 years of age when they began working in the position in which they are plateaued.

### Career Histories

Respondents provided complete job histories from the beginning of their careers. This included length of time in each position, the direction of each move—upward (increased responsibility), lateral (same level of responsibility), and downward (decreased responsibility)—and the types of moves made (changed company, geographic transfer, or new position at the same location).

### Measures of Career Attitudes

Fear of stagnation was measured using a 4-item scale. This scale indicates the extent to which individuals are unwilling to accept career plateauing: for example, "Since all managers cannot reach the top, it's best to be satisfied with a middle level position rather than to frustrate oneself trying to reach the top." Subjects responded to items on a 7-point Likert type pattern ranging from strongly agree to strongly disagree. Statements were reversed and randomly dispersed throughout the questionnaire to avoid artificially high reliabilities due to the grouping of like items. Coefficient alpha for this scale was .70.

Career impatience was measured using a 3-item Likert type scale. This scale indicates the extent to which individuals are unwilling to be patient with their career progress: for example, "promotions should be largely a matter of seniority and experience and thus one should wait his turn." Coefficient alpha for this scale was .85.

Marketability was determined by asking subjects to rate their chances of obtaining a position in another company as good as their present one on a scale from 0 (no chance) to 100 percent (excellent chance).

Propensity to leave was determined by asking subjects to indicate their willingness to leave for a better job in another company on a 5-point scale from 1 (would not move) to 5 (would definitely move).

Satisfaction with each of Herzberg's (1968) motivation-hygiene factors (achievement, responsibility, recognition, advancement, work itself, salary, co-workers, supervisor-human relations, supervisor-technical competence, and company policies and practices) was measured using a 2-item Likert type scale. The statements were taken from research by Dunnette, Campbell, & Hakel (1969), in which they report using a Q-sort to develop statements representing the Herzberg factors and in which an effort was made to minimize the impact of social desirability. The two statements with the highest factor loading for each item were selected for inclusion, one negatively worded and one positively worded.

### Measures of Career Path Potential

To measure elasticity or the relative potential for future mobility in a position, the actual mobility of the prior occupant of the position was utilized. Respondents were asked to indicate how many years their predecessors held the job they now hold and the type of move their predecessors made when they moved. The predecessor's tenure, in years, was weighted by multiplying it by a 1 if the exit was upward, a 2 if the exit was lateral or to another company, and a 3 if the exit was downward or to retirement. A coefficient of elasticity was computed by dividing 1 by the weighted tenure. The coefficient ranges from a minimum of about .01 to a maximum of 1.

An exposure/visibility index was developed by first asking respondents to estimate the percentage of time per week they were involved in projects that gave them exposure to upper management. Second, they were asked to indicate how visible they were to upper management by estimating the amount of direct feedback for their efforts they received from top management on a 5-point scale of "never" (0 percent) to "always" (100 percent). These two percentages were multiplied together and then multiplied by 100 to create the exposure/visibility index. The index can range from 0 to 100.

Career opportunities were measured by asking respondents to indicate the number of positions they could be asked to fill, at their level or above, in their company if a vacancy existed.

## RESULTS

All response distributions were analyzed by company and found to be similar across all the companies. The makeup of each group was also analyzed and found to be proportionately represented by each company. Career histories of the deadwood, solids, and control group were compared by analyzing the average number of years each group remained in the first through the sixth career positions. Only the first six positions were compared because the sample size decreased significantly beyond that point. As can be seen in Table 1, the average stay time in each of the

## TABLE 1
## Mean Years in Position 1 through 6 for Plateaus Versus Control Group[a]

| | *Plateaus* | | | | | | *Control* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Deadwood* | | | *Solids* | | | | | | | |
| *Position* | $\bar{X}$ | *S.D.* | *(N)* | $\bar{X}$ | *S.D.* | *(N)* | $\bar{X}$ | *S.D.* | *(N)* | *F* | *Contrasts*[b] |
| 1st | 3.29 | 3.14 | (129) | 2.84 | 2.26 | (115) | 3.52 | 3.67 | (705) | 1.96 | n.s. |
| 2nd | 3.75 | 2.96 | (129) | 3.40 | 2.65 | (115) | 3.60 | 3.14 | (705) | .40 | n.s. |
| 3rd | 5.09 | 4.46 | (126) | 4.63 | 4.20 | (112) | 4.01 | 3.91 | (705) | 4.35* | D:C |
| 4th | 6.23 | 5.61 | (113) | 4.72 | 4.21 | (100) | 3.68 | 3.49 | (694) | 20.64** | D:S:C |
| 5th | 5.61 | 4.86 | (84) | 5.50 | 4.30 | (81) | 3.48 | 2.58 | (669) | 27.00** | C:D,S |
| 6th | 6.27 | 4.31 | (67) | 6.66 | 5.71 | (64) | 3.16 | 2.27 | (520) | 57.22** | C:D,S |

[a] The *N*s vary because not all respondents have held six positions.

[b] Using Scheffé the contrasts can be interpreted as follows at $\alpha = .05$:

D:C = Deadwood mean is significantly different from control mean.

D:S:C = Deadwood mean is significantly different from both solids and control mean. Solids mean is also significantly different from control mean.

C:D,S = Control mean is significantly different from both deadwood and solids means.

*$p < .01$

**$p < .001$

group's first and second positions was not significantly different. However, for positions three through six, significant *F*-ratios were found. By the third position, the sample size begins to decrease for the plateaus, indicating that few managers have moved into a plateaued position by this point. The largest shift into a plateaued position for both deadwood and solids occurs in the fifth position, a point at which an additional 22.5 percent of the deadwood and 16.6 percent of the solids have plateaued.

To look for differences in these career histories, a posteriori contrast test was utilized (Scheffé, 1969). The Scheffé test was chosen because it does not require equal sample sizes and because it was the most appropriate for examining all combinations of group means and not just pairwise combinations (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). The Scheffé test is unlikely to result in the rejection of the hypothesis that the means are equal when they are equal, but it is more likely than other techniques to lead to the assertion that no difference exists between two means when a difference does exist. Therefore, Scheffé generally recommends that a less restrictive level of significance be utilized. The most frequently utilized is $\alpha = .10$. However, given the subjective nature of some of the data, an alpha level of .05 was used (Edwards, 1968).

The results, shown in Table 1, indicate no significant difference in stay time between deadwood, solids, and the control group in their first and second positions. However, in their third position, deadwood stayed significantly longer than did the control group, averaging one additional year of stay time. In the fourth position, deadwood continued their tendency to stay longer, averaging 1.5 years longer than the solids and 2.5 years longer than the control group. It is also worth noting that in the fourth position, the solids also began to lose ground to the control group—staying an average of one year longer. In the fifth and sixth position, both the deadwood and solids continued to fall behind the control group, averaging stays from 2 to 3.5 years longer.

In addition to stay time, each group's career history was examined for differences in direction of movement and type of movement. In direction of movement, no significant differences were found. The deadwood reported 84.6 percent of all their moves as upward, 12.9 percent as lateral, and 2.5 percent as downward. The solids reported 89.4 percent upward, 8.5 percent lateral, and 2.1 percent downward. Similarly, the control group reported 85.1 percent upward, 12.2 percent lateral, and 2.7 percent downward. On a move-by-move basis, the only significant difference found in direction was between the deadwood and solids on their moves to the third position. Here, the deadwood reported 84.3 percent of their moves as upward and 14.2 percent lateral. In contrast, the solids reported 92.9 percent upward and 4.5 percent lateral ($\chi^2 = 6.68$, $d.f. = 2$, $p \leq .05$).

**TABLE 2**

**Percentage of Overall Career Moves Made by Plateaus and Control Group by Type of Move[a]**

| | *Plateaus* | | |
|---|---|---|---|
| *Type of Move* | *Deadwood Moves (N=519)* | *Solids Moves (N=472)* | *Control Moves (N=3,293)* |
| Changed company | 15.6 | 9.5 | 9.8 |
| Geographic transfer | 24.3 | 29.2 | 29.1 |
| New position—same location | 60.1 | 61.3 | 61.1 |

[a] Deadwood versus solids: $\chi^2 = 9.5$, $df = 2$, $p \leq .01$; deadwood versus control: $\chi^2 = 18.1$, $df = 2$, $p \leq .001$; solids versus control: n.s.

As can be seen from Table 2, significant differences were found in the types of moves each group made. Deadwood were more prone to change companies than were the solids and less likely to be geographically transferred. Because changes in company often necessitated geographic relocation, both the deadwood and the solid's careers involved, in total, the same number of geographic relocations. The deadwood were more prone to change companies than were the control. But, because the control group moves more frequently, they actually make, in total, the same number of such moves as the deadwood. There was no difference in the distribution of types of moves between the solids and the control group, although here again the absolute number differs. On a move-by-move basis, there was no significant difference found between the three groups. However, when the first three career moves (movements to the second, third, and fourth positions) of the deadwood were combined and compared with those of the solids, a significant difference was found. During that time, 18.2 percent of all the deadwood's moves involved new positions in other companies, compared to only 10.5 percent for their counterparts ($\chi^2 = 8.85$, $d.f. = 2$, $p \leq .02$).

Table 3 presents the results of the analysis on the other career factors. Of the 10 Herzberg motivation-hygiene factors, only data on advancement satisfaction are reported because the differences on all the other measures

## TABLE 3
## A Comparison of Career Factors of Plateaus to the Control Group[a]

| | *Plateaus* | | | | *Control* | | | |
|---|---|---|---|---|---|---|---|---|
| | *Deadwood* | | *Solids* | | | | | |
| *Career Factors* | $\bar{X}$ | *S.D.* | $\bar{X}$ | *S.D.* | $\bar{X}$ | *S.D.* | *F* | *Contrasts*[b] |
| *Career attitudes* | | | | | | | | |
| Fear of stagnation | 17.64 | 3.91 | 17.84 | 3.95 | 18.18 | 3.85 | 1.28 | n.s. |
| Career impatience | 13.86 | 2.94 | 14.48 | 2.89 | 14.76 | 3.03 | 5.04* | D:C |
| Marketability | 57.95 | 27.60 | 56.30 | 28.84 | 66.49 | 26.48 | 10.98** | C:D,S |
| Propensity to leave | 3.05 | 1.29 | 2.78 | 1.39 | 3.05 | 1.32 | 2.03 | n.s. |
| Advancement satisfaction | 8.41 | 2.85 | 8.43 | 3.08 | 9.29 | 2.93 | 8.05** | C:D,S |
| *Career path potential* | | | | | | | | |
| Elasticity | .05 | .04 | .06 | .05 | .08 | .05 | 6.20* | D:C |
| Exposure/visibility | 7.51 | 11.86 | 9.32 | 12.54 | 12.09 | 14.75 | 6.43* | D:C |
| Career opportunities | 4.22 | 7.60 | 4.77 | 6.92 | 6.26 | 11.91 | 2.48 | n.s. |

[a] *N*s are: Deadwood, $N = 129$; Solids, $n = 115$; Control, $N = 705$.

[b] Using Scheffé, the contrasts can be interpreted as follows at $\alpha = .05$: D:C = Deadwood mean is significantly different from control mean; C:D,S = Control mean is significantly different from both deadwood and solid means.

*$p < .01$

**$p < .001$

failed to achieve even modest statistical significance. As is evident in the table, three of the career attitudes investigated were significantly different: career impatience, marketability, and advancement satisfaction. Although deadwood averaged a lower level of career impatience than did solids and the control group, the Scheffé test revealed that the only significant differences were between the deadwood and control group. On marketability and advancement satisfaction deadwood and solids were almost the same, but they were significantly lower on average than the control group.

Two of the measures of career path potential resulted in significant *F*-ratios: elasticity and exposure/visibility. Although deadwood were on the most inelastic career paths, the difference between them and the control group was the only one to be supported as significant by the Scheffé test. Examination of the elasticity coefficient revealed that the major difference between the groups was not on how the predecessor had exited (e.g., upward or to another company), but on the length of tenure of the predecessor. The deadwood's predecessors' average tenure was 9.3 years, the solids' 8.1 years, and the controls' 6.5 years. Deadwood reported the lowest levels of exposure and visibility. Here, the Scheffé contrasts revealed that the only significant difference was between the deadwood and the control group. The three groups received equal levels of feedback from upper management, but significant differences between deadwood and the control group were found in the amount of time spent per week in projects with upper management. The deadwood averaged 13.4 percent of their time, the control group averaged 20.1 percent.

## DISCUSSION

The data on timing of mobility events demonstrates that plateaus move into the positions in which they plateau as early as their third position.

Up to this position, the average timing of mobility events for each group of managers is identical. This similarity in early career supports Mayer's (1972) proposition that all persons are originally movers, but that some have reduced mobility chances over time.

By the third position, for those in the deadwood group who have not plateaued, stay time increases significantly—a trend that continues through the sixth position. In contrast, the solids' stay time does not begin to increase until the fourth position. However, for position five and six, the solids' mobility rate is comparable to that of the deadwood. These findings lend support to the tournament mobility model proposed by Rosenbaum (1979)—an historical model that assumes that information about a person's career history affects all future mobility events. In contrast, the findings do not support ahistorical assumptions about mobility events that argue that an individual's career progress is not a function of past successes or failures (Kelley, 1973).

Deadwood appear to be identifiable as early as their third management position and subsequent mobility events, in which stay time gets extended, suggest that these managers are being increasingly passed over. In contrast, solids are indistinguishable from nonplateaus until their fourth position although, even here, they are not being passed over for as long a time as are the deadwood. This pattern suggests that until almost the fifth position solids are in the mainstream of the organization. But, as Schein (1971) depicts in his cone-shaped model of an organization, once these managers achieve a higher level of centrality, they must move vertically in a hierarchy which, by its very nature, cannot accommodate the flow of all managerial talent. Hence, the solids' mobility also becomes increasingly delayed. However, because solids earn salaries significantly larger than those of deadwood and on par with the nonplateaued control group, solids are more likely than are deadwood to achieve a higher rank in the organization before they plateau or to achieve greater centrality or inclusion in the organization's inner circle or core. These findings support the notion that solids tend to become "organizationally plateaued...having the ability to perform well in higher level jobs, [but] lack openings"; and the deadwood tend to become "personally plateaued...they are seen by the organization either as lacking in ability for higher jobs, or as not desiring a higher level job" (Ference et al., 1977, p. 604).

The results on types of moves provide a glimpse of the ways in which plateaus' careers unfold. Fairly early in their career, deadwood are more prone to change companies, achieving their highest rate of migration in positions two, three, and four. The solids, true to their namesake, are the least likely of any of the groups to change companies—suggesting that they have a more traditional orientation toward career (Hall, 1976). It is possible that some deadwood organizationally job-hop more frequently because they begin their careers with a more "protean" orientation (Hall, 1976), but it is more likely that they are victims of an early career mismatch (Kotter, 1973; Wanous, 1978)—choosing to leave because of lower job satisfaction or being asked to leave because of poor job performance (Wanous, 1980). In any case, contrary to much of the literature on mobile managers (Jennings, 1971a; 1971b), the fact remains that ineffective plateaus also show a greater tendency to job-hop interorganizationally in early career. Hypotheses in want of additional research are whether deadwood are the true burned out victims of pursuing the "mobility ethos" (Veiga, 1981) or, given evidence of only marginal performance, they are victims of organizational mismatch. Nevertheless, the evidence so far suggests that ineffective plateaus are diverted in early career into paths in which they are increasingly passed over, suggesting that early and perhaps premature decisions are being made about their career potential.

Contrary to expectations, the plateaus did not express significantly lower levels of fear of stagnation. In part, this confirms the belief that managers tend to pay lip-service to the "unlimited success theory," whether or not they have been mobile (Tausky & Dubin, 1965; Veiga, 1981). However, the deadwood were the most willing to be patient with their careers' progress: perhaps a coping mechanism acquired during prolonged periods of being passed over. Paradoxically, such an attitude also may be interpreted by the organization as a lack of sufficient desire, a factor that has been suggested as contributing to personal plateauing (Ference et al., 1977).

As expected, the nonplateaued managers expressed the greatest confidence in their marketability. In all likelihood, such confidence is bolstered by continued career movement and undermined by being left behind. In addition, Gould (1979) found that the degree to which individuals engage in career planning activities is related to their self-concept. Therefore, it is plausible that plateaus less actively engage in searching out and analyzing career opportunities in other companies, thereby reducing the degree to which they believe they are marketable.

Most managers were somewhat ambivalent about the prospects of leaving. However, because of the average age of the respondents in this study, this attitude is understandable at their stage of career (Sofer, 1970; Veiga, 1973). Given the career status of the plateaus, one might normally expect them to express a higher propensity to leave, which they did not. Although the very nature of their career histories suggests that beyond the deadwood's early career migration few plateaus, even when faced with prolonged stay times in a position, have tried or have been successful in finding more mobile career opportunities.

Out of all the sources of job satisfaction and dissatisfaction investigated, only one was found to be significantly different—the nonplateaued managers, not too surprisingly, were the most satisfied with advancement. Despite the lack of a consistently strong relationship, either positive or negative, between job satisfaction and performance (Brayfield & Crockett, 1955; Vroom, 1964; Wanous, 1980), deadwood have been depicted as having potential motivational problems (Connor & Fielden, 1973; Ference et al., 1977). Although some deadwood experience initial difficulty in finding an organizational match, the comparable levels of job satisfaction suggest that they find a niche. However, because they generally receive lower levels of compensation and had received lower salary increases in the previous year (50.3 percent of the deadwood had received no increase in salary in the previous 12 months), it is much more likely that they are experiencing some performance problems which, from a rehabilitation point of view, should be easier to correct.

The attempts at measuring the relative potential of career paths resulted in two significant findings. As expected, plateaus—especially deadwood—are more likely to be in a position in which the prior occupant had also plateaued. In addition, deadwood are in positions in which the level of exposure to upper management is half what it is for the control group, perhaps, as Jennings (1971a) has pointed out, because of the occupant's actions. Ference et al. suggest that personal plateauing may occur because "skill deficiencies could arise from. . . lack of exposure to responsibility or developmental opportunities" and because of "some individuals. . . failing to take active steps to move along a viable career path" (1977, p. 605). This study's findings offer some support for that point of view. A future research question remains: whether deadwood experience less exposure because they are, in fact, ineffective performers or because they are in a position in the hierarchy at which their predecessors have not successfully built a power base.

In conclusion, additional research is needed to understand more fully the circumstances surrounding the plateaus' career decisions. In particular, longitudinal research designs will be necessary to explain further how career attitudes develop as plateaus' careers unfold. For example, on the surface, the job satisfaction data suggest that plateaus, including the lower paid deadwood, appear to have adjusted effectively to their career status. Longitudinal analysis could have helped to sort out the degree to which they experienced any temporary maladjustment and its subsequent impact on the development of their career attitudes. Such analysis could prove especially fruitful if it included a careful examination of the content of early career assignments. Without the ability to go behind the scenes of ineffective plateaus' career assignments and choices, one can only speculate on the forces that shaped such careers. However, in light of the paucity of research focused on managerial plateaus, such intensive research might best be postponed until more is uncovered through exploratory research.

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# *Realistic Job Previews and the Adjustment of New Employees*[1]

**BERNARD L. DUGONI**
**DANIEL R. ILGEN**
**Purdue University**

*The study investigated three possible psychological processes underlying the use of realistic job previews (RJPs). RJPs were hypothesized to reduce turnover through (1) lowered expectations and increased job satisfaction, (2) improved ability to cope with unpleasant job circumstances, and (3) the creation of a perceptual set of greater openness and honesty within the company. None of the hypotheses received strong support.*

The initial contact between prospective organizational members and those within the organization is often a frustrating experience for everyone. Both the organization and the individual have a need to gather accurate information about the other in order to reach a decision. Yet, both feel a need to look attractive to the other; this increases the possibility of biasing the information exchanged (Porter, Lawler, & Hackman, 1975).

Weitz (1956) demonstrated that if organizations resisted the temptation to present themselves to prospective employees in an unrealistically positive light, it was not more difficult to attract new employees than if unrealistically positive information were presented. More importantly, the use of this more realistic information reduced voluntary turnover. Since Weitz's original research, similar effects of such information which Wanous (1973) termed Realisic Job Previews (RJPs) have been found in a variety of settings. (See, for example, Goversall and Meyers, 1966; Ilgen and Seely, 1974; Macedonia, 1969; Youngblood, 1963; Wanous, 1973.)

Although the evidence is quite strong that RJPs affect voluntary turnover, little has been done to examine why the effect occurs. The purpose of this research was to investigate several possible causes for the effects of RJPs on voluntary turnover.

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The most commonly accepted explanation for why RJPs reduce voluntary turnover is that proposed by Porter and Steers (1973), Wanous (1973, 1977, 1980), and others (Dunnette, Arvey, & Banas, 1973; Katzell, 1968; Weitz, 1956). This position hypothesizes that RJPs lower initial expectations. Furthermore, it is argued that lower expectations are more easily met on the job than higher ones. As a result, those holding lower expectations should be more satisfied with their jobs assuming that unmet expectations are less satisfying than met expectations (Porter & Steers, 1973). Because satisfaction consistently has been found to correlate negatively with voluntary turnover (Mobley, Griffeth, Hand, & Meglino, 1979; Porter & Steers, 1973), it was hypothesized that RJPs lower voluntary turnover by producing higher levels of job satisfaction among those exposed to them as compared to those who receive the information typically available. This position has been termed the met expectations hypothesis (Porter & Steers, 1973).

In spite of the acceptance of this hypothesis, very few have explored its necessary links. For this to be true, RJPs should lead to lower expectations, lower expectations should lead to higher job satisfaction, and higher job satisfaction should lead to lower voluntary turnover. Only Wanous (1973) showed that initial expectations were lowered by RJPs. However, he found no statistically significant effects of RJPs on turnover in his sample and thus was unable to demonstrate the complete sequence of RJPs affecting turnover through job satisfaction. Also, he reported no data related to the correlation of initial expectations to satisfaction.

A second way that RJPs may affect turnover is by improving the new employee's ability to cope with the job (Ilgen & Seely, 1974; Wanous, 1977, 1980). This hypothesis states that, if employees are made aware of problems to be faced on the job, they cope with such problems better when they arise, either because they are less disturbed by problems about which they have been forewarned or because they may prerehearse methods of handling these problems. With respect to the former alternative, Finkelman and Glass (1970) found that stress was reduced if an event was predictable rather than unpredictable.

Finally, the RJPs may convey, indirectly, a message of openness and honesty to the recipient. To the extent that applicants generalize this to the organization, those who receive RJPs may believe that the organization is likely to deal with them in an open and honest manner. Assuming that nothing occurs on the job to dispel such beliefs, the net result should be an increase in the attractiveness of the organization to the individual. Presumably, the increase in attractiveness should decrease the propensity to leave that organization voluntarily.

The present research was designed to investigate the extent to which each of these psychological processes operated in a field setting in which RJPs were administered. Although three explanations were investigated, it should be stressed at the outset that none of the three excludes the possibility of the others' occurrence. That is, the three hypotheses are not mutually exclusive in the strong inference sense (Platt, 1964).

## METHOD

### Participants

Employees in the customer service department of five retail outlets of a large midwest retail food chain participated in the research. All were either checkers or baggers in the checkout lanes and were classified as permanent part time employees. This classification referred to employees who worked 30 or less hours per week on a permanent basis. Although the stores were part of a food chain, the retail outlets carried a wide range of merchandise in addition to groceries. Each store had a staff of approximately 200 permanent part time employees responsible for the jobs of checker or bagger.

Three groups of employees participated in one of two capacities. The first group, the survey sample, provided the data to be used in the RJP treatment. It consisted of 130 employees who had been with the company for not less than six months and not more than a year.

The second and third groups participated in the experimental phase of the study. All these individuals were applicants to be hired on a permanent part time basis as checkers and baggers at two retail outlets that were to be opened for the first time in January 1977. On the basis of preliminary screening, the company selected 320 applicants to be offered a job. These 320 individuals were randomly assigned to two equal sized groups—an experimental and a control group. Each group was equally represented in each store. Although, from the standpoint of treatment contamination, it would have been preferable to assign treatments randomly to stores rather than to individuals, major differences between the stores precluded this. The neighborhoods and thus the applicants for the jobs were very different in terms of racial and ethnic characteristics and socioeconomic status. Therefore, it was felt that the possibility of a smaller treatment effect due to the possibility of communication between members of the experimental and control groups would have to be risked. To have confounded the treatments with the other differences between stores would have been unacceptable.

From the 320 employees potentially available for the research, the actual sample was reduced for four reasons. First, all were offered a job but four declined the offer. Second, and most important, the organization laid off or fired 40 percent of the newly hired employees (layoff = 94, fires = 34) within the first two months. Third, 28 new employees voluntarily quit during the first month and prior to the administration of a second questionnaire essential for testing several of the hypotheses. These three factors reduced the original sample to 160 employees. Of these, 119 (or 74 percent) provided complete data by returning their second questionnaire. This latter sample represented the two groups on which the analysis was based. Of these, 70 were in the experimental group and 49 were in the control group.

In spite of the relatively large drop from the original sample, the reduced sample appeared to be a reasonable one primarily because most of the sample reduction was due to company policy unrelated to the RJP manipulation. Customer volume was far below that estimated for the first month and was due to several factors beyond the control of the management—weather, the closing of a main access street, lack of completion of other retail outlets in the shopping complex, etc. Therefore, the company policy was very understandable and acceptable to employees. Second, the dismissal of personnel occurred across treatment conditions; it was not confounded with treatment.

### Realistic Preview Material

In order to develop the content for the realistic preview, a survey was conducted with the first group of 130 employees, The questionnaire consisted mainly of the following two open-ended questions.

1. "Describe in your own words, something that happened while working that made you feel very good about your job. I felt very good about my job when...."
2. "Now, describe in your own words something that happened while working that made you feel very bad about your job. I felt very bad about my job when...."

Two raters independently sorted responses to each of these items into categories. They then discussed each statement that they had sorted into different categories and arrived at a consensus. Five areas of concern were identified in this fashion. These were: customer relations, co-workers, supervision, duties/policies, and hours.

Materials for the RJP orientation program consisted mainly of the data from the survey with detailed descriptions of specific critical incidents that were representative of the five areas identified. For example, under the topic of hours, it was pointed out that work schedules were set one to two weeks in advance, but that sometimes situations arose that required last minute changes. It also was noted that an effort was made to avoid these problems but that they happened frequently, and employees were upset when they had to work on what they had thought would be their day off.

### Procedure for Experimental and Control Groups

Recruitment materials asked applicants to report to the office of the stores in late November or early December to complete an application form and a brief interview. In mid-December just prior to the holidays, those applicants whom the company desired to hire were called and asked to report for a follow-up interview. These interviews were scheduled such that approximately 30 people were present at the store at one time. When the people had arrived, all were told that they had been selected to be hired and would receive an orientation to the job immediately. Four persons chose not to accept the offer.

Two separate orientations were developed; one for the control group and one for the experimental group. The control group received the company's standard orientation program that dealt with administrative details, company policy, the completion of payroll forms, etc. The experimental group received this same procedure but also received a 30 minute presentation of the results of the new employee survey. This presentation involved a description of the survey and a discussion of its results with specifically prepared graphs and charts as illustrations for emphasis. The presentation was conducted by the first author who was introduced as the one who had developed and conducted the survey.

Upon completion of the formal presentations for both groups, all new hires completed the initial expectations scale described in detail below. Then all participants were scheduled to report to work for the opening of the stores scheduled for late January 1977.

Two months after the stores opened, a second questionnaire was administered to all employees from both groups who were still on the job. On one day during a two-week period, each employee was scheduled to report to work approximately one-half hour earlier than he or she was needed at the work station. During that time, they completed the second questionnaire and sealed it in an envelope that was returned to the researchers' university address.

## Measures

*Initial Expectations Scale*—Items were constructed to tap the five content areas to which the orientation was directed (i.e., customer relations, co-workers, supervisor, duties/policies, and hours). Subscales were designed to sample events dealing with each content area so as to represent, as much as possible, the issues raised in the survey. These items were embedded in a longer scale asking expectations about other issues covered in the orientation of both groups in order to make the items of concern less obtrusive. All items required employees to rate the extent to which they expected that the condition described would be the case on their job, using a 6-point scale with the following anchors: never true, almost never true, sometimes true, frequently true, nearly always true, and always true. Two example items are: "It is unlikely that you will have to work later than your scheduled time" and "Checkers cannot be required to work as baggers." The first item was classified in the category dealing with hours and the second with duties/policies.

Job expectations scores for each of the five categories were based on the average of items within the category with appropriate items reverse scored so that high scores reflected a positive expectation. Internal consistency reliabilities for subscales ranged from .37 to .79 with a mean of .54.

*Perceived Job Situation*—After the employees had been on the job two months, the same 35 items again were administered. This time the employees were asked to describe their job as it was rather than as they expected it to be. The same 6-point scale was used, and five subscales of job perceptions were formed.

*Job Satisfaction*—The measure of satisfaction dealt both with overall job satisfaction and with satisfaction with specific aspects of the job. The questions in the specific job satisfaction portion of the questionnaire dealt with the particular situations mentioned in the RJP and paralleled the expectations questionnaire. As before, five subscales were constructed. For example, satisfaction items matching the items described in the presentation of the Initial Expectation Scale were: "The number of times I have been able to leave at my scheduled time" and "The extent to which I do exactly what I was hired for." These and all other satisfaction items were rated on a 5-point scale ranging from very dissatisfied to very satisfied. The average coefficient alpha of these subscales was .63. The overall satisfaction score was simply the average of items comprising the subscales (coefficient alpha = .77). In addition, the short form of the Minnesota Satisfaction Questionnaire (MSQ) (Weiss, Dawis, England, & Lofquist, 1967) was administered, and it correlated .79 with the overall satisfaction measure.

*Coping*—The coping scale was a self-perception measure of how well the employees felt they coped with specific incidents selected to measure each of the five areas covered in the orientation. Participants were presented with a critical incident and were asked to rate (1) the frequency with which they had encountered the incident, (2) how well they felt they handled the situation, and (3) how upset they felt they had been when they first encountered the incident. Each was measured on a 5-point Likert scale, and the frequency of occurrence was used to eliminate from the coping analyses those individuals who had never encountered the event.

*Openness and Honesty*—The final score consisted of items asking for employees' responses toward the company in general. Of these items, 11 dealt with the extent to which the employees felt the company was open and honest with them (coefficient alpha = .81). All items were measured on a 6-point scale ranging from never true to always true.

*Turnover*—Turnover data were collected from the company records over a 4-month period (from the second to the sixth month). Of the 119 who completed both phases of the study, 23 left the organization between the second and the sixth month; 20 were classified as voluntary turnover, one as a layoff, and two as fired.

## RESULTS

To test the effects of the RJPs on expectations, satisfaction, coping, and openness, a multivariate analysis of variance was used (Morrison, 1967). An examination of the profiles formed by the mean scores on each of the variables showed no difference between groups in the pattern of

## TABLE 1
## Univariate Comparisons of Experimental and Control Groups on Expectations, Perceptions, Satisfaction, Coping, and Openness

| *Variable* | *Group Means* | | *F* | *p-level* |
|---|---|---|---|---|
| | *Experimental* | *Control* | | |
| Expectations (average) | 3.85 | 4.12 | 15.62 | $\leq .01$ |
| Customers[a] | 3.61 | 4.08 | 7.18 | $\leq .01$ |
| Co-workers | 3.29 | 3.71 | 9.00 | $\leq .01$ |
| Supervisors | 4.43 | 4.02 | 2.19 | n.s. |
| Duties/policies | 2.89 | 3.82 | 16.97 | $\leq .01$ |
| Hours | 3.23 | 3.84 | 18.66 | $\leq .01$ |
| Perceptions (average) | 3.76 | 3.92 | 5.29 | $\leq .05$ |
| Customers[a] | 3.71 | 3.85 | .72 | n.s. |
| Co-workers | 3.10 | 3.30 | 2.31 | n.s. |
| Supervisors | 4.12 | 4.41 | 1.37 | n.s. |
| Duties/policies | 4.50 | 4.79 | 1.30 | n.s. |
| Hours | 3.10 | 3.30 | 2.02 | n.s. |
| Satisfaction | 3.67 | 3.72 | .35 | n.s. |
| Coping (handled) | 3.88 | 4.45 | 4.98 | $\leq .05$ |
| Coping (upset) | 3.88 | 4.33 | 3.20 | n.s. |
| Openness | 3.92 | 4.11 | 1.69 | n.s. |

[a] Specific subscales for expectations and perceptions were not included in the multivariate analysis.

scores ($F=1.6$; *d.f.* $=7{,}111$; $p=$ n.s.). Rather, the differences between groups were a function of the level of the scores ($F=2.98$; *d.f.* $=7{,}111$; $p \leq .01$). The means for these analyses are shown in Table 1.

### Expectations and Perceptions

As predicted, expectations were significantly lower in the experimental group ($\bar{x}=3.85$) than in the control ($\bar{x}=4.12$). However, for perceptions of the job at the end of two months, the experimental group was still lower than the control group ($\bar{x}_e=3.76$ vs. $\bar{x}_c=3.92$, $p \leq .05$). This finding was not expected.

For these data, the experimental group held significantly lower expectations in all subscale categories except supervision. In this case, the expectations were somewhat higher, although this difference was not statistically significant. With regard to job perceptions, although the difference between groups on the overall perception scale was significant, none of the individual subscales showed significant differences between the groups.

### Satisfaction

Table 1 shows that the two groups did not differ in their overall job satisfaction after two months on the job. There also were no differences in satisfaction on any of the five categories covered in the RJP. It must be concluded that the RJP had no effect on job satisfaction in this study.

### Turnover

As noted above, those who left the company between the second and sixth months could be classified into one of three categories—voluntary turnover, layoffs, and fired. The difference between the experimental and control groups on the proportion who voluntarily quit was marginally significant using a $z$ test for the difference between proportions (Downie & Starry, 1977). The proportion of quits equalled .13 for the experimental group and .22 for the control group ($z = -1.37, p \leq .10$). No differences between groups were observed regarding those who were fired or laid off during the third to sixth month on the job.

### Met Expectations

The rationale behind the met expectations hypothesis with regard to RJPs was that lowered expectations should be more easily met and, therefore, more satisfying. Furthermore, higher levels of satisfaction should be associated with lower turnover. To investigate this effect, two sets of links should exist. First, the necessary condition is that satisfaction should be correlated negatively with voluntary turnover. This was the case for overall satisfaction ($r = -.20; p \leq .05$) and for two of the five subscales—duties/policies ($r = -.23; p \leq .05$) and hours ($r = -.20; p \leq .05$).

To avoid the use of difference scores, the relationship between met expectations and job satisfaction was tested using semipartial correlations. The semipartial correlations removed the contributions of job perceptions to job satisfaction and assessed the effects of expectations on satisfaction with perception held constant. Data relevant to these analyses appear in the first four columns of Table 2. It is apparent from these data that perceptions reliably predict satisfaction for all but one of the subscales as well as the overall mean, but that no independent contribution to satisfaction is made by expectations after perceptions are removed. This was true for satisfaction with each facet and overall satisfaction. Furthermore, neither expectations nor perceptions correlated directly with turnover. Clearly, the met expectations hypotheses received no support.

### Coping

An examination of the coping data revealed two conflicting findings. First, Table 1 shows that there was a significant difference between the experimental and control groups in their reported ability to handle difficult situations presented in the RJP session. Unfortunately, this difference was opposite to that predicted; control group members reported handling these situations better than did those in the experimental group.

Not reported in Table 1 are the responses to the question asking how frequently the employees had encountered each specific situation of interest. Examination of the frequency of occurrence measure revealed that

TABLE 2
Correlations of Job Facet Expectations and Perceptions with Job Satisfaction and Turnover

| | Job Satisfaction | | | | Turnover | |
|---|---|---|---|---|---|---|
| | Correlation | | Semipartial[a] Correlation | | | |
| | Facet | Overall | Facet | Overall | Correlation | Semipartial Correlation |
| Expectations | | | | | | |
| Customer | .19* | .01 | .07 | .05 | .16 | .16 |
| Co-workers | .19* | .18* | .16 | .11 | .01 | .06 |
| Supervisors | .08 | .06 | .01 | .01 | .03 | .00 |
| Duties/policies | -.10 | -.08 | -.06 | .07 | .08 | .08 |
| Hours | .08 | .04 | .10 | .07 | -.03 | .02 |
| Overall | — | .14 | .04 | — | .05 | .05 |
| Perceptions | | | | | | |
| Customers | .31** | .23* | — | — | .02 | — |
| Co-workers | .14 | .32** | — | — | .05 | — |
| Supervisors | .34** | .23* | — | — | .13 | — |
| Duties/policies | -.05 | -.11 | — | — | .03 | — |
| Hours | .47** | .30** | — | — | .07 | — |
| Overall | — | .50** | — | — | .00 | — |

[a] Semipartial correlations removed the variance due to perceptions from expectations.
$^{*}p \leq .05$
$^{**}p \leq .01$

the experimental group reported encountering significantly fewer of the problem situations $(p \leq .05)$. One would expect that people working on the same job in the same setting would encounter the same types of situations. Thus this result was unexpected. It suggested the possibility that the employees who had received a realistic preview knew what to expect and did not view some of the situations as problems. As a result, they recalled these situations as occurring less frequently.

### Openness and Honesty

There were no significant differences between groups on the climate scale. However, the observed difference in perceptions of supervision mentioned above may be an indirect indication that RJPs can influence some general perceptions of the company. This will be discussed more fully later.

## DISCUSSION

### Hypotheses

Three possible explanations were offered as reasons why RJPs affect turnover. None received strong support. Nevertheless, the data do give some bases on which to judge the viability of each of the three and to suggest modifications of the proposed processes.

The process brought into most serious question is that of met expectations. Recall that this position states that RJPs lower expections, lower expectations lead to higher satisfaction, and higher satisfaction leads to lower turnover. To support this hypothesis, the study needed to find (1) an RJP effect on expectations, (2) expectations negatively correlated with job satisfaction, (3) satisfaction negatively correlated with turnover and, if all of these held up, (4) RJPs negatively correlated with turnover. Of the four necessary conditions, three were observed, although the effect of RJPs on turnover was only marginally significant. The link that did not hold up was the one between expectations and satisfaction.

Two sets of data in the present study lead to a serious challenge of the notion that job satisfaction can be raised by lowering expectations. First, the semipartial correlational analyses of Table 2 showed no systematic relationship between satisfaction and initial job expectations when present perceptions of the job were held constant. Because the groups did not differ on their perceptions of any one of the five job dimensions at the end of the two months but did differ on four of the five for initial expectations, if satisfaction were a function of the difference between initial expectations and perceptions, there should have been an expectation effect for these analyses. Clearly there was not. Second, in two cases the first column of Table 2 shows a significant *positive* correlation between initial expectations and satisfaction. The direction of these correlations is opposite that necessary if met expectations were to have affected satisfaction as hypothesized.

Confidence in the met expectation hypothesis is shaken further by the lack of a demonstrated link between lowered expectations and higher satisfaction in the literature. In none of the studies recently reviewed by Wanous (1977, 1980) is there direct support for the notion. Therefore, given the fact that all links in the met expectation model held up except for the one between expectations and satisfaction and that the literature fails to provide support for this link, it is time to question seriously the hypothesis. Unless future data can be provided to support it, it seems reasonable at this point to conclude that lowering expectations does not raise satisfaction in the RJP process.

With regard to the other two hypotheses, one must be more equivocal. For coping, one set of data contradicted the hypothesis whereas another set offered some tentative support for it. That is, although the control group reported handling difficult situations better than did the experimental group, the experimental group believed they encountered *fewer* situations that were difficult to handle. With respect to openness and honesty there was no difference between groups. Yet, indirect evidence implied that the realistic preview may have raised expectations for open and honest treatment that were not met on the job. This conclusion is implied from the expectation and perception means for beliefs about supervision (Table 1). Considering a 2×2 table of experimental versus control and expectations versus perceptions, a 2×2 ANOVA with repeated measures on the latter dimension was run. A significant interaction ($F=3.93$; $d.f.=1,117$; $p\leq .05$) was found. Inspection of the means shows that those who were given RJPs elevated their initial beliefs about their supervisor, and these beliefs dropped over time. The opposite occurred for the controls. This implied that the RJP treatment may have generalized to a more positive view toward management in general and toward the supervisor—the representative of management at the employees' level. In other words, the RJP may have created an inflated expectation against which to judge the supervisor. When the supervisor did not meet these expectations, he or she was judged to be even less open and honest than was the case for those in the control group who were not given the RJP treatment. This explanation, admittedly, is speculative. Yet the existence of this effect leads to the conclusion that the openness and honesty notion still may offer a possible psychological process through which RJPs operate. Further research is needed to explore this effect.

### Limitations

The greatest limitations of the study were associated with conditions that arose from the research site. The most serious of these was the need to dismiss such a large number of employees during the first month. In spite of the fact that the conditions were seen as justifiable and beyond the control of the management, the fact that many were being laid off had to be a factor in employees' perceptions of the job. Nevertheless, because layoffs occurred across the two conditions, they should not have differentially affected the two groups and, therefore, should not have led to misleading interpretations of differences between groups.

The larger differences in demographic characteristics of the neighborhoods that led to the need to apply both treatments within stores more than likely led to treatment contamination. Although this too was across rather than confounded with treatments and therefore should not have led to misinterpretation, it could explain the relatively weak turnover effect of RJPs and the lack of strong support for the coping and openness hypotheses. On the other hand, contamination is a less plausible explanation for the failure of the met expectations hypothesis because the pattern of relationships predicted by the hypothesis held up except for the expectation-satisfaction link.

A third limitation concerns the sample. If permanent part time employees respond differently from full time employees, the ability to generalize to other samples would be limited. This again does not seem to be a problem. The few studies that do compare full time to part time employees give little reason to conclude that the groups differ in their reactions to work settings if differences in the type of job are controlled between the groups (Logan, O'Reilly, & Roberts, 1973; Miller & Terborg, 1979).

A final possible limitation of the study deals with the mode of presentation of the RJPs. Wanous (1980), in his new book on organizational entry, suggests that verbal presentations are less effective than other means of presentation such as films or booklets. To the extent that this is true, the effect would have been the same as the contamination one—a weakened RJP effect. No doubt this could have influenced the present findings. However, there is one counterargument. The verbal presentation did have a significant effect on beliefs about the work setting (i.e., expectations). Because in all other explanations about RJP effects it is assumed that the effects follow from the set of cognitions established by the RJP, the establishment of such cognitions in the present study implies that the mode of presentation was strong enough to accomplish what must have resulted from the presentation. Therefore, it is difficult to argue that the mode of presentation was ineffective, although other modes may have been more effective.

## Conclusions

The research was designed to demonstrate that one or more of three possible psychological processes operate to cause realistic job previews to aid job survival. Although none of the three received strong support, the data were strong enough to question seriously one of them. This one was the met expectations hypothesis. In particular, the data lead one to doubt the assumption that lowering expectations about job conditions raises satisfaction with these facets.

Wanous (1980) points out that RJPs are no substitute for good working conditions. The present authors strongly concur. Telling prospective employees about unpleasant working conditions may improve the probability that they will remain on the job in comparison to those who are not told about the conditions. However, the data in this study imply that those who are told about less pleasant conditions will be no more satisfied with them once they are experienced than will those who are not told. To improve satisfaction and the quality of work, ultimately some changes must be made in those aspects of the work environment with which employees are dissatisfied.

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# *Profiles of Performance, Performance Evaluations, and Personnel Decisions*

**ANGELO S. DeNISI**
**University of South Carolina**
**GEORGE E. STEVENS**
**Arizona State University**

*A laboratory experiment was conducted on profiles of performance: high, average, or low; stable or variable; ascending or descending. Level of performance was found to be the most important determinant of performance evaluations and several other personnel decisions (such as salary increase). Stability of performance was less important. Ascending performance was viewed as more favorable than descending performance.*

Evaluation of employee performance is a common practice in modern organizations. Because many organizational rewards (such as raises and promotions) often are tied to these evaluations, and because an employee's perception of equitable treatment is important for both motivation and satisfaction, it is critical that evaluations of employee performance are consistent with their true levels of performance, that is, are accurate and valid. Unfortunately, as noted by Borman (1978), among others, organizations often are forced to rely on subjective evaluations of employee performance that simply are not accurate. There have been numerous attempts to improve these evaluations by devising new appraisal instruments (Smith & Kendall, 1963), or by training raters to reduce common rating errors (Latham, Wexley, & Pursell, 1975). Again, it is unfortunate that attempts to improve rating accuracy by using new appraisal instruments generally have been unsuccessful (Landy & Farr, 1980), and Bernardin (1979) points out that, by concentrating on eliminating psychometric errors rather than on improving ratings directly, training programs may actually produce less accurate ratings.

Bernardin (1979) suggests that, instead, training efforts should concentrate on making raters "better" raters. That is, raters must recognize what a worker should do on the job, understand how to evaluate performance, and base evaluations only upon actual performance observed. It becomes important, then, to understand the way "extraneous" or nonperformance factors influence evaluations. Past research has identified a number of such factors (which cannot all be reviewed here), including the ratee's race (Bigoness, 1976; DeJung & Kaplan, 1962; Hamner, Kim, Baird, & Bigoness, 1976); the ratee's sex (Deaux & Taynor, 1973; Dipboye, Fromkin, & Wiback, 1975; Rose & Andiappan, 1978); the age and experience of the ratee (Svetlik, Prien, & Barrett, 1964); contrasts with fellow work group members (Grey & Kipnis, 1976); and the extent to which rater and ratee agree on how the job should be done (Barrett, 1966).

An additional factor that might potentially influence performance evaluations, but which has received little attention, is the *pattern* of performance exhibited by a worker. That is, if two workers have the same overall level of performance, but one is a more stable performer than the other, or one worker has been steadily improving while the other is getting worse, these two workers may be evaluated differently. There have been only two studies examining the impact of patterns of performance on evaluations, and the results of the two still leave many unanswered questions.

Jones, Rock, Shaver, Goethals, and Ward (1968), for example, found that a worker whose performance improved over time was rated as less able and less likely to do well in the future than a worker whose performance declined over time, even though overall performance was the same for the two workers. Thus, their results supported a primacy effect that was contrary to what they predicted and earlier literature had suggested. Their study, however, did not consider overall performance ratings as a dependent measure.

A subsequent study by Scott and Hamner (1975) involved workers whose performance was either stable or variable in following ascending, descending, or random patterns of performance. In all cases, the workers exhibited the exact same levels of overall performance, and overall ratings were obtained from raters. They reported that the more variable worker was seen as more able than the stable worker (although they did acknowledge that the best single trial performance of the variable worker was better than the best single trial performance of the stable worker), but that the stable worker was rated as more highly motivated than the variable worker, but not as highly motivated as the ascending worker. These authors reported no other effects for pattern or stability, including no effect for either on ratings of overall performance.

Taking the results of both studies, there is some confusion concerning the effect of performance patterns on ratings. Jones et al. (1968) found order effects (i.e., ascending vs. descending) for ratings of both ability and expected future performance. Scott and Hamner (1975) found order effects only for motivation, but the effects were in the opposite direction from those reported by Jones et al. (1968), and they found an effect for the variability of performance (not considered in the earlier study) on ability ratings. Furthermore, although Scott and Hamner (1975) reported no pattern effects on ratings of overall performance, which is encouraging because true performance was the same for all workers, the raters were able to base ratings on an objective measure of performance (how many bags of marbles were filled), a cue not usually available to raters. Such an objective measure (the number of problems solved) also was available in the Jones et al. (1968) study, raising the possibility that both studies underestimated the effect of performance patterns on evaluations.

In summary, then, the two previous studies produced either incomparable or conflicting results, actual levels of performance were not varied, and the impact of performance patterns was considered only for ratings of overall performance, expected future performance, ability, and motivation. Note that subjects were asked to *rate* workers' ability and motivation, not to make attributions to these factors, as is the more common practice, for example, Terborg and Ilgen (1975). Ratings of future success, for example, are of interest only if they are related to the administration of organizational rewards usually tied to performance, such as raises or promotions. The present study, then, was designed in an attempt to reconcile the two earlier studies and to extend this research by considering the impact of patterns of performance upon other personnel decisions.

Specifically, the present study will present subjects with graphic sales figures for a fictitious manager, Terry Miller. The study employs a between-subjects design with eight performance patterns portrayed (high and stable, high and variable, average and stable, average and variable, low and stable, low and variable, ascending, and descending). Subjects will be asked to make attributions to ability and effort/motivation; to rate Miller's overall performance and expected future performance; to make a series of decisions concerning the allocation of rewards to Miller; and to rate his desirability as a co-worker.

Despite the conflicting results in the past, several hypotheses can be formulated to be tested in the present experiment. They are:

1. *Higher level performance will result in more positive evaluations of performance and expected future performance, greater allocation of organizational rewards, and more positive ratings of co-worker desirability.*

It would seem that the level of performance should be a major determinant of overall ratings because it is both unambiguous and closely tied to the notion of "valid" performance ratings (Borman, 1978). In addition, if past performance is seen as a good predictor of future performance and if organizational rewards are indeed tied to performance, all other ratings should follow the same pattern. Because there is no clear literature on which to make predictions about the level of performance and attributions, no specific hypotheses will be tested.

2. *Stability will be an important determinant of ratings only within levels of performance.*

Following from the arguments above, the level of performance would seem to be the major factor determining ratings, and stability would be important only when the level of performance is held constant. Thus, it is hypothesized that, within each level of performance, variable performance will result in less favorable ratings than will stable performance, but that there will be no main effect for performance stability (i.e., no significant differences in the ratings given stable and variable performers across all three levels of performance). Because ability has in fact been termed a "stable" attribution relative to effort (Weiner, Frieze, Kukla, Reed, Rest, & Rosenbaum, 1971), however, stable performance is predicted to result in relatively stronger attributions to ability, and variable performance is predicted to result in relatively stronger attributions to effort.

3. *Ascending performance will result in more positive evaluations than will descending performance.*

Although this hypothesis contradicts the general pattern of results reported by Jones et al. (1968), their "primacy" effect was unexpected and itself contradicts expectations based on within-person contrast effects and the value of improvement. See, for example, Lifson (1953). This hypothesis *is* consistent with the tendency reported by Scott and Hamner (1975) for ascending workers to be rated consistently (though not significantly) higher than descending workers. Unfortunately, the conflicting results of the earlier studies provide no bases for making predictions concerning attributions to ability or effort.

## METHOD

### Subjects and Procedures

A total of 160 undergraduate subjects participated in the study on a voluntary basis for no course credit, with no names required. A complete set of responses was obtained from only 147 subjects (67 females), and all analyses were conducted on this slightly smaller sample. Preliminary analyses indicated that male and female subjects differed significantly on only one rating in one experimental condition. The data for male and female subjects thus were combined for all subsequent analyses. All subjects completed the same questionnaire, following the presentation of Terry Miller's 6-month sales figures. Experimental conditions were manipulated as stated below, and assignment to experimental conditions was completely random. Subjects completed the questionnaires at the start of a class and were debriefed in their classes following the completion of the study, although it was made clear that the study was not part of their courses.

### Terry Miller and Performance Conditions

All subjects were given an identical description of Terry Miller, a retail sales manager for the fictitious Wellington Chain. The description included nonperformance information about Mr. Miller (e.g., his age and marital status) and stated that his sales figures for the previous six months were given in a graph which also included the average sales figures for that period for managers in comparable positions with the Wellington Chain. A note was added reinforcing the graphic data, indicating that this average sales figure was $10,000 a month.

Each subject received just one set of sales figures for Miller, but there were eight possible configurations of sales figures resulting in eight performance conditions. In order to make the baseline average sales figures for all workers more realistic, there was some variance from month to month, although the monthly figures were all between $9,000 and $11,000, with no consistent pattern. The six month mean baseline sales figure portrayed was exactly $10,000. The eight patterns of performance for Terry Miller illustrated:

1. High and stable performance: Sales figures differed from one month to the next by no more than $500, or half the maximum difference in the baseline average figures. The six month mean sales figure portrayed here was exactly $13,000. This profile, then, is technically not "stable" because there is some variability. This variability makes the profile more realistic, however, and this profile is more stable than the baseline average profile. Also, a small pilot study indicated that subjects did perceive this and other stable profiles as more stable than the variable profiles presented. (Pilot subjects also reliably distinguished among different levels of performance presented.)
2. High and variable performance: Sales figures differed from month to month by as much as $2,000, or twice the maximum difference in the baseline average figures. The six month mean sales figure portrayed was exactly $13,000.
3. Average and stable performance: Sales figures differed from one month to the next by no more than $500. The six month mean sales figure portrayed was exactly $10,000.
4. Average and variable performance: Sales figures differed from one month to the next by as much as $2,000. The six month mean sales figure portrayed was exactly $10,000.
5. Low and stable performance: Sales figures differed from one month to the next by no more than $500. The six month mean sales figure portrayed was exactly $7,000.
6. Low and variable performance: Sales figures differed from one month to the next by as much as $2,000. The six month mean sales figure portrayed was exactly $7,000.
7. Descending performance: Sales figures moved steadily downward from a high month's sales figure of $13,000 to a low month's sales figure of $7,000. The six month mean sales figure portrayed was exactly $10,000. Thus this profile portrayed a decline from a month's sales equal to the mean figure for the "high" conditions, to a month's sales figure equal to the mean figure for the "low" conditions, and the overall mean is equal to the mean figure for the "average" conditions.
8. Ascending performance: Sales figures moved steadily upward from a low month's sales figure of $7,000 to a high month's sales figure of $13,000. The six month mean sales figure portrayed was exactly $10,000.

All variable performance profiles followed exactly the same pattern, as did all stable performance profiles, and the ascending profile was simply the inversion of the descending profile.

### Questionnaire Measures

The two pages following the graphic sales figures contained all the ratings and evaluations subjects were asked to make. Subjects were first asked to make attributions for Miller's performance to ability and effort or motivation, by rating the importance of each potential cause of performance on 5-point scales (lower ratings indicating less importance). Subjects then were asked to rate Terry Miller's overall performance (using a 5-point scale ranging from "totally inadequate" to "outstanding") and the probability of his performing successfully in the future (using a 5-point scale ranging from "virtually no chance" to "virtually certain"). Next, subjects were asked to make decisions regarding three types of organizational rewards: promotion (rating Miller's promotability on a 5-point scale ranging from "not presently promotable" to "extremely promotable"); raise (percent salary increase for the following year, open-ended, but given the constraints that all increases must be at least 8 percent to cover cost of living and could not exceed 14 percent); assignment to a special training program designed for future department managers (indicating their decision on a 5-point scale ranging from "definitely do not send" or "definitely send"). Finally, subjects were asked to rate how desirable they would consider Terry Miller as a co-worker (using a 5-point scale ranging from "extremely undesirable" to "extremely desirable").

## RESULTS

The means and standard deviations for each rating obtained in each performance condition are given in Table 1. A one-way analysis of variance (ANOVA) was conducted for each dependent variable across the eight performance conditions to determine the extent to which evaluations varied as a function of performance information. Significant effects ($p < .05$) for condition were obtained for all ratings except the decision whether or not to send Terry Miller to the special training program, and the two attributions. A multivariate analysis of variance, considering all dependent variables, was conducted. The resulting $F$ statistic used to test the significance of Wilks' lambda ($\lambda$) was 2.58, which is significant ($p < .01$).

Because there was a high degree of intercorrelation among ratings of performance, expected future performance, recommended raise, promotability, and desirability as a co-worker, these variables were combined to form a composite variable in order to make data analyses more efficient. The composite was formed by simply summing responses to each individual item (coefficient alpha of the composite was computed to be .84). Results for this composite variable will be discussed in lieu of results for

## TABLE 1
## Mean Ratings and Standard Deviations for Eight Performance Conditions

| Variable | *Performance Condition*[a] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* |
| Performance | 2.70<br>(.67) | 2.60<br>(.84) | 4.14<br>(.38) | 3.25<br>(.89) | 4.12<br>(.99) | 4.33<br>(.71) | 2.71<br>(1.11) | 4.36<br>(.50) |
| Future success | 3.20<br>(.63) | 3.00<br>(.47) | 4.00<br>(.01) | 3.75<br>(1.04) | 3.85<br>(.46) | 3.89<br>(.33) | 2.62<br>(.74) | 4.00<br>(.45) |
| Percent raise | 8.75<br>(.98) | 8.50<br>(.85) | 10.86<br>(.69) | 10.56<br>(.98) | 11.00<br>(1.50) | 11.00<br>(1.22) | 8.25<br>(.46) | 11.36<br>(1.36) |
| Promotability | 2.20<br>(.79) | 1.70<br>(.95) | 3.00<br>(.82) | 2.88<br>(.99) | 3.38<br>(1.06) | 3.44<br>(1.13) | 1.50<br>(.76) | 3.91<br>(1.04) |
| Training | 4.40<br>(.52) | 3.90<br>(.99) | 4.71<br>(.49) | 4.38<br>(.92) | 4.00<br>(.76) | 4.22<br>(1.09) | 4.12<br>(.83) | 4.45<br>(1.04) |
| Co-worker | 3.30<br>(.34) | 3.20<br>(.63) | 4.00<br>(.58) | 3.88<br>(.99) | 4.56<br>(.53) | 4.00<br>(.71) | 2.88<br>(.99) | 3.82<br>(1.08) |
| Ability | 3.90<br>(.88) | 4.60<br>(.70) | 4.14<br>(.38) | 4.13<br>(.83) | 4.67<br>(.50) | 4.44<br>(.53) | 4.09<br>(.83) | 4.38<br>(.74) |
| Effort | 4.20<br>(.79) | 3.70<br>(.82) | 4.43<br>(.53) | 4.33<br>(.74) | 4.56<br>(.53) | 4.38<br>(.71) | 4.38<br>(.74) | 4.45<br>(.52) |
| Composite evaluation[b] | 24.47<br>(3.21) | 19.75<br>(4.39) | 25.47<br>(2.79) | 23.15<br>(3.09) | 28.16<br>(4.44) | 27.18<br>(2.65) | 19.36<br>(4.56) | 27.97<br>(2.83) |

[a] Performance conditions: low/stable; low/variable; average/stable; average/variable; high/stable; high/variable; descending; ascending.

[b] This composite was formed by simply summing ratings for performance, future success, percent raise, promotability, and co-worker. Values, then, could range from 9 to 34.

## TABLE 2
## Intercorrelations Among Variables

| *Variable* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* |
|---|---|---|---|---|---|---|---|---|
| 1. Performance | — | | | | | | | |
| 2. Future success | .69** | — | | | | | | |
| 3. Percent raise | .69** | .59** | — | | | | | |
| 4. Promotability | .73** | .67** | .59** | — | | | | |
| 5. Training | .13 | -.04 | .21* | .23* | — | | | |
| 6. Co-worker | .37** | .41** | .34** | .38** | .08 | — | | |
| 7. Ability | .17 | .24* | .07 | .20* | -.04 | .09 | — | |
| 8. Effort | .15 | .19 | .18 | .27* | .20* | .29** | .22* | — |
| Level of performance[a] | .34** | .24** | .31** | .28** | .05 | .27* | .10 | .26* |
| Stability of performance[b] | .11 | .06 | .01 | .05 | .04 | .04 | .08 | -.04 |

[a] Coded so that 1 = low performance, 2 = average performance, and 3 = high performance.

[b] Coded so that 1 = stable performance and 2 = variable performance.

each individual variable, to conserve space, in addition to results for assignment to training and the two attributions. Intercorrelations among all variables (including a dummy-coded index of the level and stability of performance) are presented in Table 2.

### Level and Stability of Performance

A series of two-way analyses of variance (ANOVAs) was conducted to test the first hypothesis as well as, in part, the second hypothesis. The analyses investigated the effects of the level (high, average, or low) and the stability (stable or variable) of performance on the composite ratings, assignment to training, and the two attributions.

The first hypothesis predicted a main effect for the level of performance on the composite variable and assignment to training, with no predictions generated relative to the attributions. A significant effect for level was obtained for the composite variable ($F=4.32$, $p<.01$), but not the assignment to training, and no significant effects were obtained for the attributions. Also, as predicted, the mean rating for the composite variable for high level performance (27.67) was significantly higher than was the mean rating for average level performance (23.81, $t=2.34$, $p<.05$), although this was not significantly higher than the mean rating for low level performance (22.11). Thus, the first hypothesis received strong support in the present study.

Relative to the second hypothesis, there was a marginally significant main effect for stability of ratings on the composite variable ($F=2.28$, $p<.10$), indicating somewhat higher ratings for stable than for variable performance. There was only a significant level × stability interaction effect ($F=4,02$, $p<.05$) for assignment to training, which will be discussed below, and no significant effects for stability on either attribution, although ratings tended to vary as a function of stability in the manner predicted.

A more direct test of the second hypothesis, involving comparisons between stable and variable performance within levels of performance, however, was more encouraging. A look at ratings on the composite variable shows that for low level performance, stable performance resulted in significantly higher ratings (24.47) than did variable performance (19.75, $t=4.03$, $p<.01$). For average level performance stable performance again resulted in significantly higher ratings (25.37) than did variable performance (22.16, $t=3.42$, $p<.01$). The difference between stable (28.16) and variable performance (27.18) for high level performance was not significant, however.

The interaction effect obtained for assignment to the special training program does deserve some discussion. The stable performer was more likely to be sent to the training program at both low and average levels of performance (although these differences are not significant), but at the high performance level there was a slight, nonsignificant tendency to send the variable performer. These results would seem to indicate some confusion on the part of the subjects in deciding whether or not being sent to the training program was actually a reward, which would help explain the low correlation between this rating and the other evaluations considered.

## Ascending vs. Descending Performance

The final hypothesis predicted that ascending performance would result in more favorable evaluations than would descending performance.

The mean ratings for these conditions are given in Table 1. The results of a series of *t* tests comparing them are discussed below.

The tests indicated that ascending performance resulted in significantly higher ratings on the composite evaluation ($t = 6.80$, $p < .01$). Ascending performance also resulted in more likely assignment to the special training program, stronger attributions to effort and weaker attributions to ability, but these latter differences all were nonsignificant.

It is noted that, although both of these conditions are technically "average" in that the mean performance for the six months was right at the average level ($10,000), and variable, they were treated quite differently than were the other average conditions. Reference to Table 1 shows that the ascending performer received ratings on the composite evaluation (27.97) very similar to those received by the high/variable performer (27.18), but significantly ($p < .05$) higher than those received by the average/variable performer (23.16). The descending performer, on the other hand, received ratings on the composite evaluation (19.36) more like those received by the low/variable performer (19.75), but significantly lower ($p < .05$) than those received by the average/variable performer (23.16).

## DISCUSSION

Scott and Hamner (1975) indicated that the primary purpose for conducting their study was to determine the validity of the criterion—performance appraisals. The results of the present study shed some further light on that validity issue. The strongest finding in the present study is that the level of performance seems to be the most salient cue for determining performance ratings, and this would seem to be a welcome piece of information. A common operational definition of rating accuracy is that the person whose actual performance is the highest should receive the highest rating, followed by the person who is the next highest performer, and so on. In the present study, ratings did generally follow the level of performance portrayed, as did the allocation of organizational rewards.

The stability of performance, although not as important, did play a rôle in determining ratings. Although no main effects for stability were predicted, it was expected that, holding a level of performance constant, raters would give more positive evaluations to a worker exhibiting a more stable pattern of performance, and this was the case for both low and average level performance. It is noted that Wexley, Yukl, Kovacs, and Sanders (1972) found significant contrast effects in the interviewer ratings only when an average applicant was preceded by low or high applicants. Consistent with earlier work on contrast effects (Rowe, 1967), they suggest that an average applicant represents a more ambiguous stimulus than either a high or low applicant and therefore requires more attention. Perhaps, in the present study, only high performance provided an unambiguous index of "true" performance, not requiring further information. The low and average performance, on the other hand, were viewed as more ambiguous and so required further attention. This would be consistent with the notion that stability cues are inherently more difficult to process and so are not used unless the usually more salient level cues are ambiguous and require the rater to focus more attention on the profile.

The consistent lack of support for Hypothesis 1 in regard to assignment to the special training program (as an organizational reward) and the general lack of relationships involving attributions, however, also must be noted. One explanation for the problems with the assignment to a special training program would seem to be that subjects felt that outstanding performers didn't need the training, even though every attempt was made to convey the assignment as an indicant of executive potential.

The lack of results relating to attributions to ability and effort is somewhat disappointing. The earlier studies asked for ratings of ability or effort, which is qualitatively different from asking for attributions. For example, a poor performer could be rated as low on ability, but performance could still be attributed to "a lack of" ability. In this study it was hoped that use of the attribution framework could help tie this line of research to other areas and thus help explain the underlying bases of personnel decisions. Also, although no strong predictions could be generated from past research on attributions, the present lack of results probably is due more to the nature of the information available to subjects or the meaningfulness of attributions in this context, rather than a general lack of relationship between performance profiles and attributions. Mitchell (1979), for example, argues that a supervisor utilizes cues about the distinctiveness, consistency, and consensus of performance in order to make attributions for an employee's poor performance. To the extent that such cues were not available to raters in the present study, attributions would be difficult to make. It is hoped that future research will allow raters the contextual cues they need to make meaningful attributions.

A real problem for the validity of performance ratings in the present study comes when ascending and descending conditions are compared. The average levels of performance are the same for these two, as are the degrees of stability. Yet, ascending performance resulted in consistently higher ratings than did descending performance. In fact, raters seemed to equal ascending performance with high performance, and descending performance with low performance. Subjects would seem to be making the assumption that the sample of performance presented them is representative of a consistent performance trend. That is, they apparently assumed that the improving performer would continue to improve and the declining performer would continue to get worse. This assumption would present some problems to performance evaluations. It could result in different ratings for two workers whose overall performance is the same.

Perhaps the major implication of these results is for future laboratory research. It is usual to represent a fictitious worker's performance by whether or not that performance has been improving or declining. These cues are available to a rater in the field, but it is difficult to generalize from laboratory results based on a single score. As for overall performance ratings, this study must reinforce Scott and Hamner's conclusion that they may be more valid than feared. Also, many organizational rewards are more likely to be given to high performers. Although these results need to be tested in a field setting, they do seem to be cause for cautious optimism.

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# *The Effects of Manager's Sex on the Assignment to a Challenging or a Dull Task and Reasons for the Choice*[1]

**RENATE R. MAI-DALTON**
**University of Kansas**
**JEREMIAH J. SULLIVAN**
**University of Washington**

*The study investigates sex biases of college students and banking executives in the assignment of a stimulus person to a challenging or a dull task. For the challenging task, participants prefer the stimulus person of their own sex. For the dull task, the results are not as clear. Reasons for the preferences are examined.*

Previous research indicates that sex discrimination against women occurs in most stages of the employment process (Terborg, 1977). For example, various studies have found that women are discriminated against with regard to recruitment and hiring decisions (Jones, 1970; Shaw, 1972; Dipboye, Fromkin, & Wiback, 1975), salary offers (Terborg & Ilgen, 1975), performance evaluations (Friend, Kalin, & Giles, 1979), promotions (Day & Stogdill, 1972), development, and supervision (Rosen & Jerdee, 1974a; Acker & Van Houten, 1974). One area of the employment process, however, that has received little attention from behavioral scientists is the assignment of specific jobs to men and women once they have been selected and hired. Yet, the kind of position an individual occupies seems to be decisive in whether or not an organization selects the employee for further career development and promotion (Berlew & Hall, 1966; Bray, Campbell, & Grant, 1974). Thus, if women were not assigned challenging, demanding jobs to the same extent as men with similar qualifications, women would be at a disadvantage from the time they entered a new job situation.

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One study that examined whether men and women are accepted for demanding or routine jobs to a similar extent was conducted by Rosen and Jerdee (1974b). These researchers asked male undergraduate business students to evaluate applicants for positions that require aggressive, decisive behaviors (demanding jobs) or positions that require clerical accuracy and dependable performance (routine jobs). The participants accepted or rejected four applicants for four different managerial positions. According to Rosen and Jerdee, "Each subject read only one version of the job requirements—demanding or routine—and reviewed information about only one applicant—male or female" (1974b, pp. 511-512). The results indicated that male applicants were accepted for managerial positions in general 71 percent of the time, but this was the case for female applicants only 59 percent of the time. In addition, male applicants had an acceptance rate of 65 percent for the demanding positions, and female applicants had an acceptance rate of only 46 percent for the demanding positions. Rosen and Jerdee concluded that women may be chosen less frequently for managerial positions than are men, and that sex discrimination in job assignments against women may be most severe when the selection is for a demanding and challenging job.

In general, research on sex bias has been criticized with regard to several design problems. One, sex bias studies usually describe only one stimulus person, either male or female, to the participants. Rosen and Jerdee (1974a) hypothesized that sex bias might disappear when managers are confronted with both a male and female employee for job assignments, because managers would be more likely to act in a fair and impartial manner when sensitized to possible sex-biased decisions. A test of this hypothesis seems important because most personnel directors do indeed choose among several applicants, some of whom are men and others are women. Two, investigators question the generalizability of results obtained with college students to the working population (Rosen & Jerdee, 1974b). Three, most studies investigating sex bias have been conducted with male subjects only (Terborg & Ilgen, 1975; Rosen & Jerdee, 1974b). Therefore, any differences between male and female participants cannot be assessed. Four, most of the sex discrimination studies have failed to extend the research design beyond the finding that sex biases exist. A logical continuation of this research would be an investigation of the reasons for sex discriminatory practices. Finally, results of male-female comparison studies might be influenced by the communication channels that are used in the experiment. For instance, Brenner and Sigband (1973) suggest that the method by which a communication is relayed might influence the decision that must be communicated. With respect to the current study, it may well be that individuals who must assign a dull, routine task to a co-worker would prefer doing so in written form in order to avoid the expected hostile feedback. In contrast, individuals who must assign a challenging, demanding task to a co-worker would enjoy doing so in a face-to-face setting because they would expect a pleasant interaction. Thus, it might be worthwhile to explore the influence of the communication channel on task assignments in studies concerned with sex discrimination.

The present experiment is predicated on these four criticisms and the communication channel hypothesis. Thus, the subjects had a choice of assigning a male or a female either to a stimulating and rewarding position or to a dull and unrewarding one. The task assignment was done either verbally or by written memo. The experiment participants were both male and female college students and male and female banking executives. In addition, participants responded to nine items that inquired about the reasons for the choices.

## METHOD

### Subjects

*College Student Sample*—The student sample included 117 males and 90 females who were enrolled in marketing and communications courses at the School of Business at the University of Washington.

*Banker Sample*—Male and female banking executives who were enrolled in the three-year program of the Pacific Coast Banking School at the University of Washington participated in the study. Of the 650 bankers (approximately 580 men and 70 women) who had registered for the mandatory two-week summer session on campus, 88 men and 14 women completed the experimental materials. The low return rate of the banking officers might have been due to the placing of the experimental materials in one of three large manila envelopes that also contained the bankers' school assignments for the two-week session. Because time was short and the work load and lecture schedule demanding, only 16 percent of the bankers took the time to complete the experimental materials. However, it is felt that $N=88$ for male participants is a sufficient sample size for data analyses. The respondents did not differ significantly from nonrespondents or between conditions with respect to age—the only other biographical variable that was available to assess the effects of self-selection.

### Procedure

Each of the participants read a scenario, described in the next paragraph, and completed questionnaire items on two subsequent pages. The cover letter asked each participant to "Make your decisions on the basis of how *you* feel, and not on what you think may be the proper or textbook thing to do." Thus, the letter cautioned against socially desirable responses.

### Scenario

Each participant was asked to imagine himself or herself to be the branch manager of a large commercial bank. The manager had been in the position for two years and had worked with two men and two women subordinates during this time. The working situation was harmonious and contained little stress. The bank manager needed to assign a specific task to one of the subordinates. The type of task and the manner of communicating it to the subordinates were systematically varied. The task was either challenging and rewarding or dull and unrewarding and had to be assigned either verbally or by written memo. An excerpt of the instructions was:

> You have been asked by the Executive Vice President of the bank to (develop a new loans policy for the bank/reorder a number of key files from one system to another). The task will be performed by (a special task group—drawing one employee from each of the branches/one of your assistant managers)...The work will be (stimulating and significant, providing a high degree of autonomy for the personnel chosen/dull and unimaginative, providing little autonomy for the chosen individual). This job will (also be rewarding/lack rewards) in terms of career development and job satisfaction. You know that the employee (assigned to this task will consider it to be very pleasant/chosen will consider this task to be very unpleasant).

Instructions for the verbal versus written task assignment were:

> You call the employee you choose on the telephone and summon him/her into your office. The employee sits down across from you and you begin by saying.../You send a memo to the person you choose which completely outlines the task. The memo begins...

The scenario described that only two of the four subordinates met the qualifications for the task. These subordinates were Jane Adamson and Paul Sandman. Both were single, thirty years old, and 1972 finance graduates of Stanford, where they had placed high in their class. Jane Adamson and Paul Sandman were described as competent managers who had worked well with their subordinates and were planning their careers carefully. Of course, the two descriptions of the stimulus persons had to be worded differently, yet describe equally competent individuals. In order to ensure comparability, the two descriptions were pretested with 25 college students (14 men, 11 women). The students were asked to rate the descriptive paragraphs on a 7-point scale. A score of 1 indicated "employee Y definitely more favorable," a score of 7 indicated "employee X definitely more favorable," and a score of 4 indicated "employees Y and X are equally favorable." The overall mean of the student ratings was 3.96. The mean for men was 3.78; the mean for women was 4.18 ($t = 1.00$, n.s.). The descriptions of the stimulus persons were counterbalanced on the scenarios. Thus, approximately half of the participants read about Jane in terms of description one and Paul in terms of description two. The remaining participants read about Jane as portrayed in description two and Paul as portrayed in description one.

After reading the scenario, each subject was asked to indicate if he/she would choose Jane or Paul for the assignment. The judgment was made on a 7-point scale. A score of 1 indicated "definitely prefer Jane." A score of 7 indicated "definitely prefer Paul." "No preference" was the midpoint of the scale. In addition, the subjects were asked to respond to nine items that evolved from theoretical concepts. Some of these have been used previously to explain sex-biased findings (Terborg & Ilgen, 1975). One item referred to recent Equal Employment Opportunity (EEO) legislation. The theoretical concepts are stereotyping and exchange theory.

The stereotyping research suggests that men and women are perceived to possess certain personality traits that enable them to be more competent in specific jobs. For example, men commonly are seen as aggressive and analytic, making them good candidates for managerial positions (Schein, 1973). Women are seen as passive and nonanalytic, predisposing them for less challenging, repetitive jobs.

Exchange theory (Homans, 1961) proposes that the interaction between two individuals is a function of what each individual expects to gain from the relationship and that rewarding exchanges have a higher probability of recurrence than do nonrewarding exchanges. With regard to the present study, if participants expected to have a more rewarding relationship with same-sex others, they would prefer to interact with them. In addition, it may be that women are perceived to demand and expect less rewards than men for similar contributions (Leventhal & Lane, 1970) and they might, therefore, be given less rewarding assignments.

The nine items that could be possible reasons (motivators) for sex-biased decisions are stated below. The theoretical concepts from which they evolved are shown in parentheses.

1. The task seemed like one suited to a person of that sex. (stereotyping).
2. The chosen person would be more interested in getting the job done than the other person. (stereotyping).
3. The chosen person would be more competent to do the assignment than the other person. (stereotyping)
4. I would feel more comfortable supervising a person of this sex in this particular task. (exchange theory)
5. There would be less chance of conflict with this person during the course of the work. (exchange theory)
6. Communicating the assignment to the employee would be easier. (exchange theory)
7. Communicating with the employee during the job would be faster and more effective. (exchange theory)
8. The chosen person would expect less of a reward for performing this task than the other person. (exchange theory)
9. By choosing this person I would avoid possible charges of sex discrimination. (EEO legislation)

The responses were made on a 7-point scale. The scale anchors were 1 = definitely do not agree and 7 = definitely agree. The midpoint was labeled "no opinion."

The experiment employed a $2\times2\times2\times2$ factorial design. The factors were occupation of participant (student/banker), sex of participant (male/female), type of task (challenging and rewarding/dull and unrewarding), and type of assignment (verbal/written). All participants were randomly assigned to the type of task and type of assignment conditions.

## RESULTS

### Anova

The $2\times2\times2\times2$ analysis of variance for the choice variable (i.e., the degree to which a student preferred Jane vs. Paul on a 7-point scale) yielded two significant results: one, a significant main effect for type of task $F(1,304) = 5.479$, $p = .02$ and, two, a significant two-way interaction between sex of participant and type of task $F(1,304) = 9.996$, $p = .002$ ($\omega^2 = .028$). The significant interaction was the result of the participants' choices in the challenging task condition. The men in the study preferred Paul for the challenging task (males $M = 4.3$), and the women in the study preferred Jane for the challenging task—females $M = 3.4$, $t(148) = 23.26$, $p < .0001$. Men and women did not show significantly different preferences for the male or female stimulus persons in the dull task condition—males $M = 3.9$, females $M = 4.2$, $t(157) = 1.28$, n.s. However, men and women participants clearly reversed their preferences from the challenging to the dull task conditions. Thus, male participants preferred Paul for the challenging task ($M = 4.3$) but had a slight preference for Jane for the dull task—$M = 3.9$, $t(203) = 3.85$, $p < .05$. In contrast, female participants preferred Jane for the challenging task ($M = 3.4$) but had a slight preference for Paul for the dull task—$M = 4.2$, $t(102) = 13.76$, $p < .001$.

### Correlation Analysis

To examine the reasons for the participants' choices, Pearson product-moment correlations between the 7-point choice variable (dependent variable) and the 7-point agree-disagree ratings for each of the nine motivators (predictor variables) were conducted. (Recall the coding for the choice variable: 1 = definitely prefer Jane, 4 = no preference, 7 = definitely prefer Paul; coding for the motivators: 1 = definitely do not agree, 4 = no opinion, 7 = definitely agree.) Table 1 shows the correlations between the choice variable and the motivators for male and female participants in the challenging and the dull task conditions.

In the challenging task condition, the male participants' preference for Paul was associated with his competence for this job ($r = .23$, $p \leq .01$) and the expectation of little conflict with Paul during the work ($r = .20$, $p \leq .05$). The female participants' preference for Jane in the challenging task condition was associated with the participants' perception that they could supervise Jane more comfortably than Paul ($r = -.33$, $p \leq .01$).

## TABLE 1
## Correlations between Choice of Stimulus Person and Motivators[a]

| | *Challenging Task* | |
|---|---|---|
| *Motivators* | *Males*<br>*N*=95 | *Females*<br>*N*=55 |
| 1. More suitable for the task (S) | .14 | .01 |
| 2. More interested in getting the job done (S) | -.03 | .06 |
| 3. More competent for the task (S) | .23** | .11 |
| 4. More comfortable to supervise (E) | .12 | -.33** |
| 5. Less conflict during work (E) | .20* | -.15 |
| 6. Easier to assign task (E) | -.02 | -.18 |
| 7. Easier communication during task (E) | .16 | -.02 |
| 8. Expects fewer rewards (E) | .09 | .07 |
| 9. Avoid sex discrimination charges (EEO) | -.21* | -.21* |

| | *Dull Task* | |
|---|---|---|
| *Motivators* | *Males*<br>*N*=110 | *Females*<br>*N*=49 |
| 1. More suitable for the task (S) | -.07 | -.10 |
| 2. More interested in getting the job done (S) | -.18* | -.35** |
| 3. More competent for the task (S) | -.30** | -.09 |
| 4. More comfortable to supervise (E) | .02 | -.12 |
| 5. Less conflict during work (E) | .05 | -.30* |
| 6. Easier to assign task (E) | .12 | -.41** |
| 7. Easier communication during task (E) | -.07 | -.29* |
| 8. Expects fewer rewards (E) | -.17* | -.11 |
| 9. Avoid sex discrimination charges (EEO) | .20* | .28* |

[a] Coding for choice variable: 1 = definitely prefer Jane, 4 = no preference, 7 = definitely prefer Paul. Coding for motivators: 1 = definitely do not agree, 4 = no opinion, 7 = definitely agree. (S) = item refers to stereotyping research. (E) = item refers to exchange theory. (EEO) = item refers to EEO legislation.

*$p \leq .05$

**$p \leq .01$

In the dull task condition, male participants, who preferred Jane, related this preference to Jane's competence for this kind of work ($r = -.30$, $p \leq .01$) and her interest in getting the job done ($r = -.18$, $p \leq .05$). In addition, male participants seemed to feel that Jane would expect less reward than Paul in this position ($r = -.17$, $p \leq .05$). Female participants, who preferred Paul for the dull task, did so despite the fact that they associated the preference for Paul with a lack of interest on his part in getting the job done ($r = -.35$, $p \leq .01$), difficulty in assigning the task to him ($r = -.41$, $p \leq .01$), communication problems ($r = -.29$, $p \leq .05$), and conflict during the work ($r = -.30$, $p \leq .05$).

With regard to the avoidance of sex discrimination charges, male and female participants were aware that they could do so when they chose the stimulus person of the opposite sex.

## DISCUSSION

The results of the present study indicate a possible change in the direction that sex discrimination might take. This seems to be the case at least in the challenging task condition, in which men and women preferred the stimulus person of the same sex. This is in contrast to earlier research outcomes that indicated that both men and women preferred men for responsible positions. In the present study, it appears that the prejudices of the women might have changed in favor of other women. Thus, the female participants preferred women for the challenging task, and the male participants preferred men for the same position. For the male sample, the results replicate the previously described findings by Rosen and Jerdee (1974b). However, with the inclusion of female participants in the present experiment it was possible to demonstrate a similar bias of female participants in favor of other women. Furthermore, despite the fact that all participants were aware that they had the opportunity to avoid a sex-biased decision by responding with "no preference," significant differences were obtained. (Various degrees of preference for either Paul or Jane were indicated by 64 percent of the women and 62 percent of the men.) Thus, Rosen and Jerdee's (1974a) hypothesis, that sex bias might disappear when subjects are sensitized to the possibility of making sex-biased decisions, is not supported.

With regard to the generalizability of the findings from a college student to a banking officer sample, it appears that students and bankers in this study made similar choices wth regard to job assignments. It should be noted, however, that these results must be viewed with caution because the response rate of the bankers was very low and the representation of women bankers was even less adequate. Nevertheless, the latter were retained because separate data analyses, comparing the female bankers and students, showed that female bankers had sex biases similar to those of the female college students. It was felt that this circumstance warranted the retention of the women bankers in the sample. With respect to the lack of significant findings for the verbal versus the written assignment manipulation, it appears that the experimental method probably was not strong enough. That is, imagining oneself to assign a task in person or by memo might not be as salient as if one actually had to do so. A follow-up experiment might use a role playing situation and obtain meaningful differences between male and female participants with regard to different assignment methods. An additional improvement of the current study would be the use of a repeated measures design. Each participant could be presented with two or more scenarios, each describing a different type of task (e.g., challenging, dull, routine). Results from such a study would indicate whether the same subject showed the same sex biases that were obtained with the present experimental design.

A final concern of this experiment was the reasons for sex-biased decisions. As predicted by exchange theory, it seems that men and women chose same-sex others for the challenging job because they expected a more rewarding relationship with these individuals. Thus, the participants felt that there would be less conflict during the work with individuals of their own sex. In addition, men seemed to justify their prejudices on the basis of role stereotyping (i.e., Paul is more competent for the challenging task, and Jane is more competent for the dull task and she would be more interested in getting the job done). These findings are congruent with previous sex discrimination research. With respect to the expectation of rewarding working relationships with same-sex others, numerous studies have indicated that men have developed a network of informal relationships to communicate more effectively with each other (Hennig & Jardim, 1977) and women oftentimes wish that a similar mechanism was available to them (Epstein, 1970; Miller, Labovitz, & Fry, 1975). Previous research also indicates that men are concerned about the competence of job incumbents. Whenever prestigious jobs had to be evaluated, men perceived other men as more competent and skilled than women (Deaux, & Emswiller, 1974; Feldman-Summers & Kiesler, 1974). With respect to the correlations between the choice variables and the motivator "avoid charges of sex discrimination," at least two interpretations are possible. The first interpretation suggests that in the challenging task condition, men and women prefer the female stimulus person in order to avoid charges of sex discrimination, and in the dull task condition men and women prefer the male stimulus person for the same reason. This argument was advanced by one of the reviewers and addresses itself to a possible case of reverse discrimination based on the nature of the *task*, i.e., females might have the edge in getting more challenging task assignments than males. The second interpretation is arrived at by looking at the means of the choice variable *and* the correlations with the EEO motivator. By doing so, it seems probable that male and female participants preferred the same-sex stimulus person in the challenging task condition and the stimulus person of the opposite sex in the dull task condition—irrespective of EEO guidelines. It just so happens that women participants can appear to be nondiscriminating either way, i.e., by assigning another woman to a responsible position and by assigning a less attractive position to a man—showing that the woman does not discriminate against men. The correlations seem to bear this out. This "reverse discrimination" interpretation of the data is supported further by the finding that women who assigned the male stimulus person to the dull task did so even though they associated this preference with the expectation of having a poor working relationship with him. Regardless of which interpretation one might choose, it is important not to lose sight of the set of relatively weak (though statistically significant) correlations on which both arguments rest.

Given the results of the present experiment, it appears that women participants may be beginning to "look out for each other" in the assignment of career enhancing positions. For the elimination of sex bias, this might be an important first step. However, because most decision making positions are still occupied by men, such a preferable treatment of women by other women will have only a limited impact on their career advancement. It should remain the firm goal of any organization to assign positions according to competence rather than the sex of the employee. Such a job assignment policy could be facilitated by human relations training that would teach men and women in organizations to feel at ease with each other and to come to trust each other's competence.

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# *Research Notes*

## MANAGERS AT WORK: A LARGE-SCALE STUDY OF THE MANAGERIAL JOB IN NEW YORK CITY GOVERNMENT[1]

**PETER ALLAN**
**Department of Personnel, New York City**

The work that managers do has long been a subject of interest to students of both private and public enterprise. For example, Fayol (1949) and Gulick (1937) defined the managing activity in terms of a number of functions. More recently, Mahoney, Jerdee and Carroll (1965) obtained estimates from managers on the amount of time they spent each day on each of the following eight management functions: planning, investigating, coordinating, evaluating, supervising, staffing, negotiating, and representing. Taking a different tack, Hemphill (1960) identified 10 dimensions for describing managerial jobs. Following up on Hemphill's work, Tornow and Pinto (1976) identified 13 position description factors. Some of the factors were similar to the dimensions that emerged from Hemphill's study. Others were different or missing from Hemphill's group.

Mintzberg (1975) sought to determine how executives spend their time and how they perform their jobs. He concluded that managers' jobs are remarkably similar and that their work could be described in terms of 10 basic roles or organized sets of behavior. Although much of managerial work is unprogrammed, all managers do have regular, ordinary duties to perform. Additionally, one of Mintzberg's major findings is that rather than being systematic, reflective planners, managers simply respond to the pressures or demands of their jobs, "that [managerial] activities are characterized by brevity, variety, and discontinuity" (p. 50)

As important as these and other studies have been, they did not focus on managers in local government. It is the purpose of this paper to provide some data on the nature of managerial work carried out by local government managers and to compare the findings with those of studies of managers in other settings. The information was provided by an unusually large sample of managers in New York City government.

### Method

In 1977-1978 the jobs of managers in New York City government were analyzed to learn whether there was a common core of managerial tasks

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[1] The author is greatly indebted to Nathan Silver of the New York City Department of Personnel, whose many thoughtful comments and suggestions helped shape this paper.

actually performed by city managers in general, regardless of their title, assignment, or employing agency. The study aimed at determining the managers' *managerial* tasks—not technical activities such as accounting, engineering, housing, and social service. The information was collected by a questionnaire made up of task statements. A draft questionnaire was developed from the relevant literature and from information provided by panels of incumbent City managers. The panels included 26 male and female managers from all hierarchical levels and various ethnic groups. The draft questionnaire was pretested on 40 city managers of both sexes and various ethnic groups and representing all hierarchical levels and various functions. Managers were permitted to enter additional statements. The responses were reviewed and some of the task statements were revised, some deleted, and others added. The final questionnaire had 146 task statements. (A copy of the questionnaire is available on request from the author.)

The questionnaire then was distributed to all City managers. For each task statement, managers were asked to indicate the *importance* of the task in carrying out their duties and the *time spent* on each task. A 5-point scale was used for each of the two factors. Each manager had to indicate whether the task was of greatest importance, very important, moderately important, of little importance, or not performed at all by the manager. Managers also were to indicate whether they spent a major part of their time on the task (over 7 hours a week), a lot of their time (about 3 to 7 hours a week), some of their time (about 1 to 3 hours a week), very little of their time (less than 1 hour a week), or no time at all. Space also was provided for managers to enter additional tasks not listed that they performed and to indicate the importance and time spent for each. Precautions were taken to reduce differences between managers' perceptions of their work and the work itself by having completed questionnaires reviewed by the managers' supervisors and by verifying responses to the questionnaires through interviews and observations of 120 managers at work.

Questionnaire responses were analyzed using Nie, Hull, Jenkins, Steinbrenner, and Bent's (1975) *Statistical Package for the Social Sciences.* Managers' responses for importance and for time spent were each weighted on a 5-point scale ranging from 4 to 0. For each task, a separate weighted average was derived for importance and time spent and the two averages added for each task. All tasks having an importance weight of less than 2 (moderately important) or a summed score (for both importance and time spent) of less than 3 were excluded from further consideration.

## Results

*Common Managerial Tasks*—A total 1,476 managers—approximately 95 percent of the estimated 1,550 incumbents—responded to the questionnaire. The managers were employed in 60 different City agencies ranging in size from 100 to 25,000 employees. The number of managers employed by these agencies ranged from 1 to 229. The managers held a large number of different titles—291 in all. However, 1,041 managers were employed in 16 titles, 3 of which accounted for 703 managers. All six levels in the management pay plan were represented, with significantly large numbers at the two lowest levels. Managers in the management pay plan are assigned to one of six pay levels—from level I to level VI. Managers at level I or II (approximately 75 percent of the total) typically are first-line or middle management, depending on assignment. Levels V and VI (5 percent of the total) typically are at the policy influencing or policy making level. The sample included line managers, heads of staff or service units, and high level technical or professional people.

Analysis of the responses identified 57 tasks as a common core of important managerial activities performed by the "typical" manager, regardless of title or agency. Each of the 57 common tasks met the criteria of an importance weight of at least 2 and a summed score for both importance and time spent of at least 3. Of these tasks, 8 were considered "very important" and 49 deemed "moderately important." Managers did not report spending more than 3 hours a week on any of the 57 tasks. They spent 1 to 3 hours a week on 14 tasks and less than 1 hour a week on 43 tasks.

*Task Differences Among Managerial Levels*—Tasks were not deemed equally important at all management levels. The importance and time spent criteria used to differentiate among levels were the same as those used to identify common tasks (i.e., an importance weight of at least 2 and a summed score—of importance and time spent—of at least 3). Beyond the 57 common tasks, 34 tasks were deemed important by managers above levels I and II. These included 9 tasks identified as important by all 4 higher levels, an additional 9 by all 3 highest levels, 11 more by the 2 highest, and 5 by levels IV and V.

Differentiating task importance by management levels led to the significant finding that higher levels of management have a substantially greater variety of important activities to perform than do lower management levels. There were more tasks deemed important by the two highest levels than by the two middle levels, and more such tasks reported by the two middle levels than by the two lowest management levels.

Unlike lower level managers, the higher levels dealt with broad, long range matters of considerable import. For example, the nine tasks common only to the four highest management levels included proposing changes in laws, rules, or regulations and setting, developing, or recommending policy. The tasks performed by only the three highest management levels included preparation of or recommendations for agency objectives and programs, and coordination of major agency activities. The highest levels had additional responsibilities for financial matters (identifying funding resources, approving major expenditures), hiring and firing people, and serving as spokespersons.

A striking finding of the analysis is that the tasks dealing with the budget and finance and the personnel selection and assignment areas are not within the province of lower level management. Activities concerned with making major expenditures, allocating funds, and identifying new funding sources are reserved for higher levels. Personnel activities confined to higher levels include evaluation of applicants, assignment and reassignment of employees, recommendations for merit increases, promotions, and disciplinary actions.

One explanation for these results may lie in the City's recent financial difficulties and consequent efforts to contain expenditures. The finding may also be explained by the locus of decision making authority in New York City government. Managers in City government traditionally have complained that they have been severely restricted in their authority to make decisions in all but routine matters; that even relatively minor decisions are made by top management and/or by the City's staff agencies (budget and personnel) in these two areas.

*Dimensions of Tasks*—Additional analysis of the data led to the identification of 6 dimensions that encompassed all 57 tasks. Although another taxonomy might have been developed, this group of six seemed reasonable and useful. Many of the tasks were multidimensional, i.e., more than one dimension was involved in performing a task. In such cases the task was included in the dimension judged to be the dominant one. Table 1 presents a brief description of each dimension.

**TABLE 1**
**Task Dimensions of New York City Managers**

1. *Supervision of employees (11 tasks):* This dimension involved assigning work to subordinates, developing them, appraising them, and assisting them with their work problems.
2. *Harmonizing (10 tasks):* Managers worked with superiors, peers, representatives of other agencies, organizations, and unions in harmonizing or integrating the work activities or parts of the organization by smoothing, persuading, and negotiating.
3. *Information handling (15 tasks):* The city manager was a focal point of communication involved in gathering, processing, and supplying information from within and without the organization.
4. *Analytical-evaluative (9 tasks):* Managers were required to analyze and evaluate laws, problems, programs, work procedures, processes, and reports.
5. *Change-initiating (8 tasks):* As change agents, managers engaged in activities aimed at changing the organization structure, tasks or procedures, or the behavior of people.
6. *Monitoring (4 tasks):* Managers were found to develop mechanisms for ensuring adequate progress toward goals, maintaining appropriate records, and inspecting ongoing activities.

Management levels differed in the relative emphasis they attached to the six dimensions. The analytical-evaluative dimension was considerably more important for the highest level managers than for managers at either the entry or the middle level, whereas monitoring was less important for the highest level than for the other two. There also was a clear differentiation between the entry level and the two higher ones in the change-initiating dimension and, to a lesser degree, in the information handling

## TABLE 2
## Number of Tasks in Each Dimension Deemed Important by Entry, Middle, and Upper Management Levels

| | *Management Levels I & II (Entry Level)* | | |
|---|---|---|---|
| *Dimension* | *Number of Common Core Tasks* | *Number of Tasks Other Than Common Core* | *Total* |
| Supervision of employees | 11 | 0 | 11 |
| Harmonizing | 9 | 0 | 9 |
| Information handling | 14 | 0 | 14 |
| Analytical-evaluative | 9 | 0 | 9 |
| Change initiating | 6 | 0 | 6 |
| Monitoring | 4 | 0 | 4 |
| Totals | 53 | 0 | 53 |

| | *Management Levels III & IV (Middle Level)* | | |
|---|---|---|---|
| *Dimension* | *Number of Common Core Tasks* | *Number of Tasks Other Than Common Core* | *Total* |
| Supervision of employees | 11 | 2 | 13 |
| Harmonizing | 10 | 2 | 12 |
| Information handling | 15 | 4 | 19 |
| Analytical-evaluative | 9 | 4 | 13 |
| Change initiating | 8 | 10 | 18 |
| Monitoring | 4 | 1 | 5 |
| Totals | 57 | 23 | 80 |

| | *Management Levels V & VI (Upper Level)* | | |
|---|---|---|---|
| *Dimension* | *Number of Common Core Tasks* | *Number of Tasks Other Than Common Core*[a] | *Total* |
| Supervision of employees | 9 | 2 | 11 |
| Harmonizing | 10 | 3 | 13 |
| Information handling | 15 | 6 | 21 |
| Analytical-evaluative | 9 | 11 | 20 |
| Change initiating | 8 | 11 | 19 |
| Monitoring | 2 | 1 | 3 |
| Totals | 53 | 34 | 87 |

[a] All of the 23 other than common core tasks for the middle level also were identified by the upper level.

and harmonizing dimensions. Table 2 shows, for entry, middle, and upper level managers, the number of the 57 common core tasks and the number of other important tasks involved in each dimension.

### Discussion

A City manager's tasks ranged from the seemingly simple and routine (maintain records or files of work flow or output) to the difficult and unprogrammed (develop organizational structures of work units). The tasks also varied greatly in breadth and depth. They included duties that usually are viewed as directing (assigning work to subordinates), planning (preparing unit objectives and goals), and control (developing control procedures). The similarity to the functions proposed by Fayol (1949), Gulick (1937), and other management process writers is clear.

Although this study is not directly comparable to that of Mahoney et al. (1965), some similarities in findings may be noted. All eight of the managerial functions in the study by Mahoney et al. are performed by City managers. The results for City managers also agree with the conclusions of Mahoney et al. that some activities are performed by managers at all levels and that managers at different levels spend different amounts of time on these activities. Despite differences in methodology and results, there are some gross similarities between the findings of the present study and the following five of Hemphill's (1960) position factors: providing a staffing service in nonoperational areas; supervision of work; internal business control; human, community, and social affairs; and long range planning. Also, the results of the present study resemble the following dimensions of Tornow and Pinto (1976): coordination of other organizational units and personnel; internal business control; staff service; and supervision.

How do the present study's findings compare with Mintzberg's (1975) results? First, the sheer number and variety of tasks performed by the City's managers and the amount of time spent on each task is consistent with Mintzberg's conclusion that managers' activities are characterized by brevity and variety. The work of upper and middle level City managers is even more discontinuous because they perform more tasks than do the lowest levels. However, the information on City managers does not permit comparison with Mintzberg's findings that managers dislike reflective activities and strongly favor action.

Next, the finding that New York managers perform a common core of tasks agrees with Mintzberg's judgment that there is great similarity in the work done by managers at all levels. The finding of task differentiation between higher and lower level managers also is consistent with Mintzberg's studies. Third, the results are consistent with his finding that managers have regular duties. City managers performed a large number of regular activities, for example, scheduling work for subordinates. Fourth, Mintzberg found that managers strongly favor the verbal media as sources of information. City managers perform many tasks involving oral communication—evidence of the importance of this medium to their work. However, it cannot be concluded from the data that they prefer oral to written communication. Fifth, the data suggest that City managers play at least eight of Mintzberg's roles—leader, liaison, monitor, disseminator, disturbance handler, resource allocator, negotiator, and entrepreneur. One other role—spokesman—is carried out by managers above the two lowest levels. It is not clear that the figurehead role is part of the City manager's job. It seems likely that this role is important for only a limited number of New York City managers (possible agency heads and their top assistants). These types of jobs were excluded from the study.

It is important to stress the limited goals of this study. In describing the jobs of city managers, the study did not attempt to differentiate between effective and ineffective managers or between managers in different occupational specialties. Nor did the study seek to identify the abilities or other attributes that managers need to do their jobs. Additional studies to probe into these areas are in the planning stages.

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# NUMBERS AND POSITIONS OF WOMEN ELECTED TO CORPORATE BOARDS

**KATHRYN RUDIE HARRIGAN**
**Columbia University**

The years 1971 to 1980 have seen increasing interest in the addition of women directors to boards of publicly traded corporations (Conference Board, 1972; Orr, 1977; Bacon & Brown, 1977). During this period some popular business literature has treated women directors as if they were representatives of special interest groups who conceivably could inhibit boards from acting irresponsibly. But there also has been research that has suggested that women directors might provide useful role models for female middle managers, audit the results of hiring and promotion policies with respect to women, or better represent the firm to a constituency by which it has been largely misunderstood in the past (Korn, 1973; Carson, 1973; Schwartz, 1980; Harris, 1972).

The present study presents findings concerning the corporate board structure of 112 firms. These findings indicate the types of industries that are more likely to elect women directors to their boards and the occupations those women are most likely to represent. They also provide insights concerning the types of industries that employ relatively higher proportions of women in middle manager positions.

A report by Heidrick and Struggles (1977) suggested that the likelihood of a company electing a woman director was positively correlated with its size and the extent of its involvement in consumer goods. Other studies have suggested that the prime qualification for service on boards is the ability to make a significant contribution (Mace, 1971). If this were indeed so, it would be expected that as women progress in the fields of law, economics, finance, advanced technologies, politics, communications, social problems, and education, they will be included with increasing frequency on corporate boards. Because women in management have earned relatively few executive positions within U.S. corporations (Heidrick & Struggle, 1978, 1979a, 1979b), it would be expected that women directors would not likely be chief executives but would be more likely to come from the ranks of law, education, or the not-for-profit sector rather than from within corporate ranks. The exception to this pattern might be found within smaller firms in which women may have helped to found the organization or were related to its founder. Field studies supplementing this survey found that such major shareholders might claim a board position by virtue of their ownership position and were more likely to serve as "private investors" rather than as officers of the firm.

## Method

Board composition was studied in 112 publicly traded firms using a questionnaire that was mailed to 200 firms headquartered within a common metropolitan center (a 56 percent response rate). The research instrument was sent to firms whose sales volumes ranged from $1 million to $1 billion and which were listed by census data as employing between 10 and 10,000 middle and upper level managers. Criterion indices were obtained from chamber of commerce profiles. The multibusiness firms responding listed and ranked as many as five Standard Industrial Codes (SIC) as comprising their principal sources of revenue. They were classified by types of industries according to the codes they provided. The sample's businesses spanned the full range of SIC indices, but underrepresented process manufacturing businesses and heavy manufacturing firms when compared with the national average indicated in the United States *Census of Manufacturers*. Hence the sample is not representative of U.S. industry in this respect.

The dependent variable in this study is the probability that a corporate director will be female. The major independent variables are sales volume, total number of employees, and ratio of female middle managers to total middle managers. Binary variables indicating the major classifications of the firms' SIC businesses were included to assess the relative likelihood of women directors serving on the boards of different types of businesses. These classifications include: high technology businesses, process, extractive, and fabrications (light manufacturing) technology firms, financial institutions, service firms, and holding companies. The pattern of industries in this sample is compared with that of the 1978 *Fortune* 500 industrials, utilities, and financial firms. A descriptive table amplifies the findings tested in the model of women directors.

## Results

There were no women directors in 79.5 percent of the firms in the sample. There were several directors in some of the other firms. As Table 1 indicates, the average probability of a firm electing at least one woman director was 20.54 percent. The likelihood of a woman director being elected is positively influenced by firm size (sales volume) and is statistically significant at the 1 percent level. The ratio of female to total managers is positively correlated with this probability. The number of total employees negatively influenced the likelihood of a woman director being elected. Only the extractive businesses and holding company variables are negative influences of large magnitude on the probability term, and these are statistically significant at the 5 percent level. The most substantial positive influences on the dependent variable are the process technology firms (these include pharmaceuticals and cosmetics as well as chemical processing

### TABLE 1
### Contributions to the Probability That a Woman Director Will Be Elected to the Board of 1 of 112 Firms[a]

Coefficient of Multiple
*Determination ($R^2$)*

$$\underset{(.1612)}{.2054}P_w = \underset{(.091)}{.1622A} + \underset{(.274)}{.0885F/T} + \underset{(.000)}{.0001S} - \underset{(.000)}{.0001E} + \underset{(.139)}{.0185I_1} + \underset{(.108)}{.0804I_2} + \underset{(.097)}{.0582I_3} - \underset{(.093)}{.0167I_4}$$

$$- \underset{(.113)}{.2268I_5} + \underset{(.111)}{.1061I_6} - \underset{(.144)}{.3049I_7}$$

Where $P_w$ = Average probability of a woman director
A = Intercept term (base case = service firm)
F/T = Ratio of women middle managers to total middle managers
S = Sales volume (in millions)
E = Employees in total firm
$I_1$ = High technology firms
$I_2$ = Financial firms
$I_3$ = Consumer-related businesses
$I_4$ = Light fabrication and manufacturing establishments
$I_5$ = Extractive industries
$I_6$ = Process-related technologies
$I_7$ = Holding companies

[a] Figures in parentheses indicate standard error of estimate.
$^*p < .05$
$^{**}p < .01$

firms), service firms, and financial institutions. These variables are not statistically significant, however. The relative average influences of these industry variables on the probability of a woman director being elected are summarized in Table 2, which was generated by subsetting the data base according to SIC categories.

Eight women directors in the sample were "insiders," one was a chairman of the board, two were financial vice presidents, two held other vice presidential positions, and the remaining three were listed as holding "other" insider positions. Among the "outsider" directors, two women were chief executives, one was an attorney, another an academician, and five were listed simply as "other." Six women directors were private investors, and four were retired government officials. Table 2 compares the patterns of outsider categories for men and women directors by industry.

High technology firms' boards more frequently included former government officials who understood defense customer needs and could provide the benefits of their political contacts. The larger boards of financial institutions, representing a cross-section of the customers they served, elected academic representatives frequently as well as a relatively large proportion of women directors who were private investors. In preliminary tests of the likelihood that a private investor (regardless of gender) would be elected to a firm's board of directors, the sales variable always had a negative sign, indicating that as sales volume increased private investors were less likely to be elected, and became statistically significant at the 5 percent level when this model was tested for the financial institutions subset.

Table 2 indicates that high ratios of female middle managers to total managers are found more frequently in those businesses that must interface with the community. One should accept these findings with some caution, however. Field interviews with 19 of the 112 respondents revealed that some firms counted administrative secretaries as middle managers and that vice presidencies are abundant within banking establishments. As Table 1 indicates, there is weak statistical support (significant at the 28 percent level) that a woman director who also is an "insider" will be more likely to be elected if the ratio of women middle managers to total managers is high.

## Discussion

Like the *Fortune* 500 patterns shown in Table 3, this survey of smaller firms found that a large proportion of women directors were elected to the boards of banks, companies producing toiletries, soaps, and drugs, and insurance firms. Unlike the women directors in the *Fortune* 500 firms, however, 24.4 percent of these directors were "insiders" (compared with 6 percent of the *Fortune* 500). A larger proportion of female industrialists

## TABLE 2
## Numbers and Positions of Managers and Directors Within Industry Groupings

| | *High Technology (12) Percent* | *Financial Products (31) Percent* | *Consumer-Related (50) Percent* | *Fabrication/ Manufacturing (34) Percent* | *Extractive Industries (18) Percent* | *Process-Related (16) Percent* | *Holding Companies (9) Percent* | *Service Firms (68) Percent* |
|---|---|---|---|---|---|---|---|---|
| Average frequency of women directors[a] | 25 | 29 | 28 | 18 | 0 | 25 | 0 | 26 |
| Average proportion of total board which is female[b] | 3.16 | 6.38 | 5.54 | 2.85 | 0 | 5.28 | 0 | 5.16 |
| Frequency of inclusion of position on board (Frequency of women in this position): | | | | | | | | |
| Private investor | 25 | 55 | 52 | 29 | 33 | 38 | 11 | 49 |
| | (0) | (13) | (10) | (3) | (0) | (6) | (0) | (9) |
| Former government officials | 25 | 13 | 16 | 18 | 6 | 13 | 0 | 10 |
| | (17) | (0) | (4) | (9) | (0) | (6) | (0) | (3) |
| Academic official | 25 | 32 | 26 | 21 | 11 | 25 | 22 | 21 |
| | (0) | (0) | (2) | (0) | (0) | (0) | (0) | (1) |
| Frequency of ratio and women middle managers to total middle- and upper-level managers: | | | | | | | | |
| 0% | 0 | 16 | 14 | 9 | 17 | 6 | 56 | 21 |
| Less than 5% | 17 | 6 | 8 | 18 | 16 | 31 | 0 | 7 |
| 5% to less than 10% | 25 | 3 | 10 | 21 | 28 | 31 | 11 | 12 |
| 10% to less than 20% | 25 | 13 | 24 | 32 | 33 | 13 | 22 | 20 |
| 20% to less than 30% | 25 | 32 | 20 | 6 | 6 | 13 | 11 | 22 |
| 30% or more | 8 | 26 | 24 | 15 | 0 | 6 | 0 | 18 |

[a] Calculated as a binary variables, where 1 = presence of woman director.

[b] Calculated as absolute number of women directors per firm divided by total number of directors per firm.

**TABLE 3**
**Women Board Members Grouped by Industry**[a]

| | *Fortune 500 Percent (N=221)* | *This Sample Percent (N=33)* |
|---|---|---|
| Aerospace | 1.8 | 0 |
| Air transportation | 1.8 | 15.2 |
| Banks | 12.7 | 33.3 |
| Chemicals | 3.6 | 0 |
| Conglomerates | 0 | 6.1 |
| Construction | 1.3 | 0 |
| Drugs, soaps, toiletries | 7.2 | 6.1 |
| Electrical equipment | 3.2 | 0 |
| Electronics | 0 | 3.0 |
| Food/agricultural, lumber and wood | 14.1 | 3.0 |
| Food, lodging, and travel | .5 | 0 |
| Health care | 1.4 | 0 |
| Insurance | 10.0 | 0 |
| Leisure services | 1.8 | 0 |
| Machinery (heavy) | 1.4 | 3.0 |
| Measurement equipment | 0 | 0 |
| Metal fabrication | 0 | 0 |
| Metal mining | .5 | 0 |
| Motor vehicles | 1.4 | 0 |
| Newspapers/publishing | 4.1 | 0 |
| Office and computing machinery and services | 1.8 | 3.0 |
| Paper | 0 | 0 |
| Petroleum/natural gas | 3.2 | 3.0 |
| Radio, TV, household appliances | .9 | 0 |
| Railroads | .5 | 0 |
| Retailing | 10.0 | 3.0 |
| Rubber | 0 | 0 |
| Specialized machinery and metal working | 0 | 0 |
| Steel | 1.0 | 0 |
| Textiles and apparel | 3.2 | 0 |
| Trucking | .5 | 0 |
| Utilities | 6.8 | 0 |
| Wholesaling | 0 | 3.0 |
| All women directors | 100.0 | 100.0 |

[a] Numbers may not sum to 100 due to rounding error.

(6.7 percent of the women directors) served on the boards of these smaller firms (compared with 1.4 percent of the *Fortune* 500), and a larger proportion of the females were private investors in this study (18.2 percent and 5.9 percent of the women directors, respectively). Also, a smaller proportion of the women directors in this study were academicians (3 percent vs. 19 percent, respectively) compared with patterns of directors in larger firms such as those in the *Fortune* 500.

The findings suggest that there may be a greater opportunity for women to become insider directors in smaller firms than in the larger firms. Outside directorships in firms that deal with the public also seem to offer greater opportunities for women to participate in corporate governance. Women managers have been an underutilized resource (Schwartz, 1980). The mandate of the Foreign Corrupt Practices Act (§2), which requires the board to ensure that fair and accurate records are maintained and important facts are disclosed, has resulted in increasing activism with regard to policy matters for many firms' boards. The need for enlightened corporate governance suggests that it would be in the interests of the firm and society to elect the most conscientious directors to administer these responsibilities. If these directors are women, they should not be overlooked. The findings from this survey indicate that a larger proportion of the directors are women within smaller firms than within the leading U.S. corporations.

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# MOTIVATION TO MANAGE AND THE MANIFESTATION OF A MANAGERIAL ORIENTATION IN CAREER PLANNING

**JOHN B. MINER**
**DONALD P. CRANE**
**Georgia State University**

Prior research has indicated, as managerial role motivation theory would predict, that university students with higher levels of independently measured managerial motivation are more likely to cite some type of managerial activity as a career objective (Miner, 1968a, 1968b; Miner & Smith, 1969). Bedeian (1977) also has shown that various personality factors, self-esteem in particular, play a role in aspiring to prestigious occupations, including managing. Research by Schein (1975, 1978) indicates that certain motivational, attitudinal, and value syndromes tend to guide and influence people in decisions throughout their careers. Significantly for the present study, he has identified a managerial competence syndrome (or career anchor), which leads individuals to seek continually for positions with greater managerial responsibility. There is other evidence that expressed vocational choices of the kind utilized in these studies are in turn rather good predictors of subsequent employment (Wiggins & Weslander, 1977).

Although none of the preceding research has employed formal career planning documents, it would appear appropriate to explore relationships between the content of such documents and managerial motivation as a next step. Accordingly the following hypothesis was formulated for test:

> *Individuals who have a stronger motivation to manage will manifest this motivation in their career planning—*
>
> *a) by describing their present work as more managerial in nature.*
> *b) by describing their planned work as more managerial in nature.*
> *c) by planning a greater degree of future change in the direction of managerial work.*

Although the essentially concurrent nature of this research precludes testing of causal relationships, the theoretical rationale underlying the hypothesis is that existing motivation to manage influences career planning statements regarding planned work. Furthermore, in the absence of special circumstances such as managerial role-motivation training that might intervene, it is assumed that motivation to manage is a generally stable characteristic. Accordingly, present motivation reflects past motivation, and that in turn exerts a causal impact on present work. Finally, it is assumed that a developmental process occurs whereby motivation to manage is increasingly likely to be tied to managerial work as an individual gains more experience in the world of work (usually with age). Thus, change from present to planned work also should reflect managerial motivation at least in the early phases of career development, before stabilization has occurred. In other words, a currently planned future position should more nearly reflect the base level of managerial motivation than a current position resulting from a decision made at some time in the past, when knowledge of work relationships would be expected to be less perfect.

## Method

*Sample*—The subjects were 56 students enrolled in a graduate level management course taught by one of the authors. A major portion of the course was devoted to personal career and life planning. The mean age of the students was 30.2 years, with a standard deviation of 4.8 years. Practically all of the students were employed on a full time basis at the time the research was conducted. There were 10 females.

*The Course*—The graduate course in management included a series of sessions on career planning, which were conducted as a pilot project for possible subsequent inclusion in the course. The Miner Sentence Completion Scale (MSCS) was administered in conjunction with the pilot module. Students completed the scale near the beginning of the course, and results were not reported until the end of the course after they submitted written career plans. This was to minimize contamination of the career plans that might result from knowledge of their MSCS scores. To test the hypotheses, the Miner Sentence Completion Scale scores were correlated with various indexes derived from the written planning documents.

The career planning portion of the course consisted of a series of lecturettes to establish a conceptual framework for career planning; a series of roundtable discussions to relate the philosophies of authors of management classics to the individual student's philosophy; several workshops on techniques pertinent to career planning; and "sharing" activities to enable the students to exchange thoughts and ideas. The end product of the course was a detailed document describing each student's life aspirations and employment plan extending at least five years into the future. This document included:

1. A detailed *analysis of personal values* that would become the basis for establishing personal life/career objectives;
2. A detailed articulation of *personal objectives* including a measure of attainment and a description of how these objectives were derived; and
3. A *personal development life/career plan* in which students analyzed their personal strengths that would help them meet objectives and identified shortcomings that would inhibit their achievement of objectives. They also delineated a plan to overcome their shortcomings and preserve their strengths.

*Measures*—Motivation to manage was measured using the Miner Sentence Completion Scale in the original free response format (Miner, 1964). This instrument yields two overall measures of managerial motivation—a total item score with a possible range from +35 to −35 and a rare score with a possible range from +8 to −8. The latter index was devised for the purpose of removing any conformity or social desirability effects that might be present in the raw item scores. The rare score was developed in accordance with the theory of projective test interpretation (Tomkins & Miner, 1957). The primary requirement of this scoring procedure is that patterns of responses given by a subject be compared against frequencies obtained from a normative group, to determine if a rare pattern (one occurring 5 percent of the time or less) is present. If a subject gives responses on a particular subscale matching one or more patterns that are rare in the normative group, a +1 or −1 is given as the case may be. The normative group utilized in obtaining this score contained managers drawn from a wide range of functional areas (Miner, 1964). The total item score is a composite of seven subscale scores, each with a possible range from +5 to −5. These subscales are designed to tap various motivational states related to managerial role requirements—attitude toward authority figures, competitiveness (measured in the context of both games and the work arena), assertiveness, power motivation as manifested in the desire to impose wishes, the desire to stand out from a group in a distinctive role, and the desire to perform routine administrative functions.

Considerable evidence of the measure's psychometric soundness, including its reliability and validity, has been accumulated (Miner, 1977a, 1978). A brief discussion of the measure's reliability and validity follows.

The reliability of the MSCS has been assessed by a number of different methods. When 20 records were rescored at 4-month intervals by the same person, perfect agreement was obtained on 95.4 percent of the individual items. When 12 records were scored independently by 2 experienced scorers, perfect agreement occurred on 92.4 percent of the items. Because of the offsetting effects, disagreements of this magnitude yield only minor variations in actual scores. Item score correlations between scorers have consistently been over .90; subscale correlations average in the high .80s (Miner, 1977b).

The MSCS has consistently yielded evidence of criterion related validity (concurrent and predictive) against criteria of managerial success (Miner, 1965, 1977a). As might be expected, managerial groups have been found to score above comparable non-managerial samples. In addition, business students aspiring to managerial careers tend to obtain relatively high scores, whereas students wishing to become teachers, accountants, counselors, and other types of professionals or specialists score low; thus the MSCS has been found to be predictive of career aspirations in the manner anticipated (Miner, 1977a).

To test the hypothesis the MSCS scores were correlated with various indexes derived from written planning documents prepared by the students toward the end of the course. The measures of managerial orientation in these documents were derived by one of the authors based on a thorough reading.

The second author was purposely not involved in this process because he had taught the career planning course and it was felt that his knowledge of the students could bias the measures. However, interrater reliability coefficients were obtained from a scoring of a random sample of 21 papers by the second author. The independently derived measures yielded coefficients in the range of .80 to .84, suggesting satisfactory reliability. Reliability coefficients were calculated for each of the four measures of managerial orientation in career planning and are as follows (these four measures are described later in this paper):

- *present work*—.83
- *planned work*—.82
- *present and planned work*—.84
- *change from present to planned work*—.80

Eliminating bias due to the fact that one of the authors taught the career planning course was a major concern. The other author had no contact with the students and thus could not introduce bias in assigning the measures of managerial orientation of present and planned work. However, the high reliability between the raters' measures suggests that possible bias of the author who taught the course did not in fact affect his scoring. The four measures obtained in this manner were:

*Managerial orientation of present work*—Each subject's reported present employment was first scored on the following scale:

4 A manager of some kind in either a business or government bureaucracy
3 A manager in an essentially professional organization
2 A business entrepreneur
1 A professional entrepreneur in either private practice or a professional partnership
0 None of the above occupations mentioned, including not employed

The value thus obtained was then multipled by 2 if there was a clear indication that the individual liked the work or was satisfied in it. The final scores thus ranged from 0 to 8. The mean was 1.8 and the standard deviation was 2.7.

*Managerial Orientation of Planned Work*—Each subject's planned work history was evaluated using the same 0 to 4 scale as for present work. The highest possible score was assigned; thus the most managerial occupation noted, other than the present job, served as the basis for scoring. This value was then multiplied by two if there was evidence in the planning document of a high level of commitment to achieving the planned work. The mean was 3.8 and the standard deviation 2.5.

*Managerial Orientation of Present and Planned Work*—This measure was simply the sum of the present and planned work scores. It provided an overall index of managerial orientation and could, and did, range from 0 to 16. The mean was 5.5 and the standard deviation 4.1.

*Change in Managerial Orientation from Present to Planned Work*—This score was obtained by subtracting the managerial orientation of present work score from the managerial orientation of planned work; thus the possible range was −8 to +8. Minus values were in fact rather infrequent, however, and the mean change score was +2 with a standard deviation of 3.2. Because the magnitude of the change scores was strongly influenced by the size of the present work value ($r = -.64$), partial correlations were used to provide the basic test of the hypothesis.

The rationale underlying these measures derives from managerial role-motivation theory (Miner, 1965). It also derives from the findings indicating a developmental sequence whereby existing managerial motivation levels are increasingly tied to managerial performance in large organizations of the bureaucratic form with increasing exposure to the world of work (Miner, 1968a; Miner & Smith, 1969). The scale was originally constituted with reference to the managerial orientation of planned work, assuming that the process of tying motivation to manage to bureaucratic management is a gradual one, often moving through various stages of approximation to the theoretical ideal.

In this scale a 4 is assigned to managing in a large and bureaucratic organization, a 3 to managing in a large and nonbureaucratic organization; a 2 to managing in an organization that is neither large nor bureaucratic, a 1 to a potentially managerial position in an organization neither large nor bureaucratic, and a 0 to a position that in no way approaches the theoretical ideal. Because commitment level is a theoretically important consideration in evaluating career planning measures, it was decided that some index of this variable should be incorporated. A multiplicative formula was utilized in order to keep the score value of a complete departure from the theoretical ideal at 0. In the absence of any theoretical or empirical guidelines, a decision was made to minimize the amount of skewing and discontinuity at the upper score levels by using a multiplier of 2.

Having established such a scale for planned work, it seemed desirable to utilize a similar approach for present work in order to make the two measures essentially comparable. The basic 0-4 scale presented no problems in this regard. However, although commitment was relatively easy to determine for the planned positions (and satisfaction could not be determined because the position had not yet been occupied), the reverse was true for present positions. Invariably the planning documents discussed present work in terms of whether it was satisfying or not, rather than in terms of commitment, if this kind of consideration was discussed at all. Thus came the decision to substitute satisfaction for commitment in the present work scale, assuming that the two variables play essentially similar roles vis-à-vis work motivation. The intercorrelations among the criterion measures are contained in Table 1.

## TABLE 1
## Correlation Among Measures of Managerial Orientation in Career Plans

| *Managerial Orientation in Career Plans* | *Present Work* | *Planned Work* | *Present and Planned Work* | *Change from Present to Planned Work* |
|---|---|---|---|---|
| Present work | — | .25 | .81** | −.64** |
| Planned work | | — | .78** | .58** |
| Present and planned work | | | — | −.07 |

*$p<.05$
**$p<.01$

## TABLE 2
## Correlations Between Miner Sentence Completion Scale (MSCS) Measures and Managerial Orientation in Career Plans

| *MSCS Measures* | *Present Work* | *Planned Work* | *Present and Planned Work* | *Change from Present to Planned Work*[a] |
|---|---|---|---|---|
| Total scores | | | | |
| Item | .35** | .40** | .48** | .02 (.33*) |
| Rare | .22 | .42** | .40** | .15 (.39**) |
| Authority figures | .03 | .15 | .11 | .09 (.14) |
| Competitive games | .17 | −.07 | .07 | −.20 (−.12) |
| Competitive situations | .03 | .12 | .09 | .07 (.12) |
| Assertive role | .31* | .19 | .32* | −.11 (.12) |
| Imposing wishes | .32* | .48** | .50** | .11 (.44**) |
| Standing out from group | .10 | .17 | .17 | .05 (.15) |
| Routine administrative functions | .12 | .27* | .24 | .11 (.25) |

[a] Partial correlations holding managerial orientation in present work constant are given in parentheses.
*$p<.05$
**$p<.01$

### Results

As indicated in Table 2, the data support all aspects of the hypothesis with some consistency. In particular, it appears that the imposing wishes index of power motivation is related positively to exhibiting a managerial orientation in career planning.

A post hoc analysis also was conducted to investigate those particular individuals for whom the managerial motivation scores did not predict managerial orientation levels in the career planning documents. The combined present and planned work managerial orientation score and the overall item score were used in this analysis, and each variable was split at the median to establish on and off quadrant cases. Using this criterion, 39 subjects were correctly predicted and 17 were not—8 with lower managerial orientations than their relatively high managerial motivation would suggest and 9 with the reverse pattern. The only finding of significance emerging from this analysis was a higher level of competitiveness among the off quadrant subjects. This was characteristic of the group whose strong managerial motivation was not matched by a comparable level of managerial orientation only; the competitive situations score for the low motivation to manage and high managerial orientation subjects was not significantly different from that of the predicted subjects.

An analysis using the grade assigned to the career planning documents by the course instructor failed to reveal any significant relationships with either independent or dependent variables.

## Discussion

The results of this research offer considerable support to managerial role motivation theory (Miner, 1965). This is most evident in the total score findings and in the imposing wishes subscale findings, but other subscales yield supporting data on occasion. The research also provides information extending prior findings regarding the role of personality factors, and motives in particular, in vocational choice directly to the career planning process. It now is apparent that strong motives can manifest themselves in career plans. Thus the study makes at least an initial contribution to an understanding of the dynamics of the career planning process.

The role that power motivation (imposing wishes) appears to play in planning for a managerial career, although not totally unexpected, emerged as much more significant than role motivation theory alone would have predicted. A check of prior studies in which managerial motivation was related to the choice of a managerial career, although not within a specifically career planning context, indicates that a similarly distinctive role for power motivation was not in evidence. However, in two of three studies the imposing wishes subscale, along with others, did differentiate those who expressed a preference for managing from those who did not (Miner, 1968a, 1968b; Miner & Smith, 1969). The samples in both instances in which differentiation did occur were made up of graduate students in their late 20s and early 30s having much in common with the present subjects. In contrast, the one case in which differentiation was not found involved undergraduates in their late teens and early 20s. On this evidence it would appear that power motivation comes to influence career processes, and managerial aspirations in particular, only at a rather late developmental stage.

The analysis intended to identify possible causes of failures in prediction from the managerial motivation measures suggests that certain individuals who have a relatively strong motive to manage and are very competitive may well plan on essentially nonmanagerial careers. The predominant orientation among these subjects is toward helping professions such as teaching and counseling. There also is a tendency to emphasize nonconfining activities of the type reflected in travel. Overall these data appear to suggest that other strong motives may conflict with the managerial motives and lead to a career planning objective outside the bureaucratic context. The other not predicted group—those with low managerial motivation, but unexpectedly high managerial orientations—are predominantly bureaucratic managers at present who are not too happy with their situation.

It is entirely possible, given their lack of satisfaction in managerial work and low managerial motivation, that they are not very effective managers and may ultimately be forced out of their managerial roles.

In considering these conclusions and speculations from analyses of the off quadrant cases, the post hoc nature of the data should be emphasized. At best these represent hypotheses for future research. In no sense do they have the same status as the basic findings of this study indicating a clear relationship between motivation to manage and the manifestation of a managerial orientation in career planning documents. These latter findings provide further evidence of the construct validity of the motivation to manage variable.

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# THE INFLUENCE OF TASK AND PERSONALITY CHARACTERISTICS ON EMPLOYEE TURNOVER AND ABSENTEEISM INCIDENTS[1]

**RICHARD T. MOWDAY**
**University of Oregon**
**DANIEL G. SPENCER**
**University of Kansas**

The impact of the motivational properties of tasks on employee attitudes and behaviors has received considerable attention in recent years. Steers and Mowday (1977) reviewed several theories of job design that predict that employees on high scope jobs (i.e., jobs high in skill variety, autonomy, task identity, task significance, and feedback) will report higher levels of job satisfaction and exhibit higher job performance and lower levels of turnover and absenteeism than will comparable employees on low scope jobs. These predictions are expected to hold particularly for employees with high levels of higher-order or growth needs. Considerable evidence is available to support the relationship between perceived job scope and job satisfaction, although the extent to which this relationship is moderated by employee need strengths is open to question (White, 1978). Less evidence is available on the relationship between job scope and actual employee behaviors, particularly withdrawal behaviors (i.e., turnover and absenteeism). Investigations of such relationships would appear to provide an important test of job design theory because relationships between task characteristics and employee behaviors are free from the problem of common methods variance, which generally plagues job perception–job attitude research.

The purpose of this study was to examine relationships between employee perceptions of their job and subsequent turnover and absenteeism incidents. Based on previous research, job scope would be expected to have a main effect on both turnover and absenteeism (Mobley, Griffeth, Hand, & Meglino, 1979; Steers & Rhodes, 1978). A number of studies have found lower turnover and absenteeism among employees in jobs involving high responsibility, autonomy, and variety. In addition, several studies have been done that suggest that employee personality characteristics are directly related to turnover behavior (Bernardin, 1977; Mowday, Porter, & Stone, 1978). In addition to the main effects of task and personality characteristics on employee withdrawal behaviors, current job design theory (Hackman & Oldham, 1976) also predicts that task characteristics and employee personality will interact in relation to turnover and

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absenteeism. Several recent studies have examined these predicted interactions with equivocal results. Mowday, Stone, and Porter (1979) found some support for the predicted interaction in a study of turnover behavior, but Katerberg, Hom, and Hulin (1978) failed to support this prediction. In addition, Hackman and Oldham (1976) found no difference in the relationship between task characteristics and absenteeism for employees with low vs. high growth need strength.

In most previous research on job design it has been assumed that the relationship between job scope and employee attitudes and behavior is linear. Recent research by Champoux (1980), however, suggests that the form of this relationship may depart from linearity at high levels of job scope. In other words, behavioral and attitudinal responses diminish as jobs become broader in scope. More specifically, he found that adding a squared job scope term to the regression of job scope, personality characteristics, and the interaction of job scope and personality on job satisfaction approximates a quadratic response function with a positive linear effect coefficient and a negative curvature effect coefficient. The curvature effect coefficient consistently and significantly increased the explanatory power of the model.

The extent to which a curvilinear relationship characterizes relationships between job scope and employee withdrawal behaviors remains to be investigated. Excessive stimulation by the job at high levels of job scope, however, might result in decreased job satisfaction and increased role stress and anxiety that are made manifest by withdrawal from the organization. *It was hypothesized that the general relationship between job scope and turnover and absenteeism would be negative, with the relationship departing from linearity at high levels of job scope.* The curvature effect coefficient (i.e., regression weight of the squared job scope term) was expected to be positive and significant, indicating that the relationships between job scope and the withdrawal behaviors would begin to level off or even become positive at high levels of job scope.

## Method

*Subjects*—Subjects for this study were $N = 569$ employees working in 7 agencies of state and county government in a midwestern state. The agencies included custodial hospitals and social service and administrative units of government. The sample was composed largely of female employees (81 percent) working in a variety of health care delivery and clerical jobs. The average age of employees participating in the study was 37 years, and average length of tenure was 6.3 years. Most employees had at least some college education.

*Measures*—Perceived task characteristics. Employee perceptions of the characteristics of their task were measured using a 14-item short-form of the Job Diagnostic Survey developed by Hackman and Oldham (1975). The 14 items were summed to form a measure of the overall motivating potential of the job, because the simple summation of items has been found to produce essentially similar results as the multiplicative combination of items suggested by the instrument developers. Hackman and Oldham (1975) discussed the psychometric properties of the scale. Coefficient alpha for the combined items was .72.

Employee need strengths. The strength of employee needs for achievement and autonomy were measured using the Manifest Needs Questionnaire developed by Steers and Braunstein (1976). Each need is measured by five items that utilize behaviorally anchored preferences in the work setting. Steers and Braunstein (1976) reported acceptable levels of reliability and convergent and discriminant validity for the scales. The internal consistency for the scales in this study, however, were lower than those reported by the instrument developers. Coefficient alpha was .52 for the need for autonomy and .43 for the need for achievement, compared with .66 and .61 for each need, respectively, reported by Steers and Braunstein (1976). It should be recognized that the internal consistency of instruments designed to measure complex personality traits seldom reaches the levels expected of other measures. In fact, some personality theorists have questioned whether estimates of internal consistency based on classical measurement theory are appropriate for personality measures. Others suggest that statistics such as coefficient alpha be considered a lower bound estimate of the internal consistency of a personality scale (Jackson & Paunonen, 1980).

Turnover and absenteeism incidents. Information on employee turnover and absenteeism was collected from agency records approximately one year following the distribution of questionnaires. Only employees who either voluntarily resigned or who remained with the organization were included in the study. Absenteeism incidents were the total number of incidents of absence for each employee during the one year period. Multiple days of absence were counted as one incident if the days were consecutive. Turnover and absenteeism were unrelated in this sample.

*Procedure*—Employees participated in the study on a voluntary basis. Questionnaires were distributed to groups of employees during working hours by the researchers. Employees were told that the general purpose of the study was to gain a greater understanding of how employees view their jobs and that it was necessary to get employee names on questionnaires in the event a follow-up study was undertaken. Employees were assured that their completed questionnaires would be held in the strictest confidence. Less than 2 percent of the respondents failed to comply with the request to provide their name.

## Results

Four separate moderated regression analyses were carried out that incorporated the two dependent variables (turnover and absenteeism incidents) and two need strength measures (need for achievement and

## TABLE 1
## Moderated Regression Analyses[a]

| Variable Entered | Turnover: Need for Achievement: Cumulative $R$ | Cumulative $R^2$ | Increment to $R^2$ | Incremental $F$ | Turnover: Need for Autonomy: Cumulative $R$ | Cumulative $R^2$ | Increment to $R^2$ | Incremental $F$ |
|---|---|---|---|---|---|---|---|---|
| Job scope | .112** | .013 | .013 | 7.15** | .135** | .018 | .018 | 10.29** |
| Personality | .147** | .022 | .009 | 5.09** | .182** | .033 | .015 | 8.58** |
| Job scope × personality | .153** | .024 | .002 | 1.06 | .188** | .035 | .002 | 1.18 |
| Job scope$^2$ | .179** | .032 | .009 | 4.97** | .207** | .043 | .007 | 4.23** |

| Variable Entered | Absenteeism Incidents: Need for Achievement: Cumulative $R$ | Cumulative $R^2$ | Increment to $R^2$ | Incremental $F$ | Absenteeism Incidents: Need for Autonomy: Cumulative $R$ | Cumulative $R^2$ | Increment to $R^2$ | Incremental $F$ |
|---|---|---|---|---|---|---|---|---|
| Job scope | .143** | .021 | .021 | 11.67** | .143** | .021 | .021 | 11.67** |
| Personality | .171** | .029 | .009 | 4.94* | .156** | .024 | .004 | 2.14 |
| Job scope × personality | .222** | .049 | .020 | 11.90** | .247** | .061 | .037 | 21.78** |
| Job scope$^2$ | .260** | .068 | .018 | 10.91** | .275** | .075 | .014 | 8.60** |

[a] Sample sizes range across analyses from 555 to 560 due to missing responses.

*$p < .05$

**$p < .01$

autonomy). Each analysis involved the eventual creation of a second order polynomial response function in which perceived job scope, need strength, the interaction between perceived job scope and need strength, and the squared job scope term were regressed, in that order, on either turnover or absenteeism incidents. The results of these analyses are reported in Table 1.

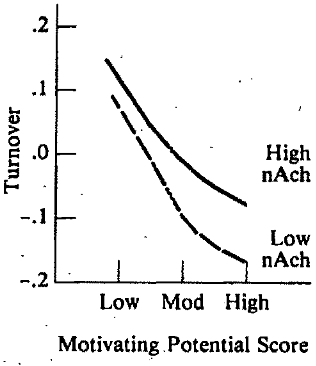
As indicated in Table 1, each of the overall regression analyses was significant, although the percentage of explained variation across the analyses was generally small. The cumulative *R*'s ranged from .179 to .275, with the percentage of explained variance in withdrawal behavior ranging from .032 to .075.

When the contribution of each independent variable entered in the analyses is examined, several patterns emerge from the results. Perceived job scope is significantly related to both turnover and absenteeism, generally explaining the largest proportion of variance in each dependent variable. The need for achievement also is related to turnover and absenteeism incidents. The need for autonomy is related to turnover but not to absenteeism.

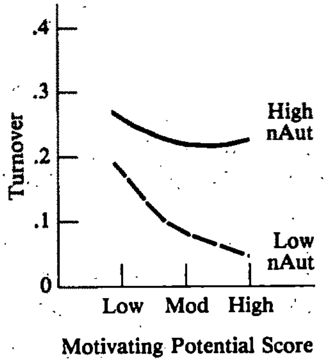
When interaction terms between job scope and employee need strengths were entered into the regression analyses, the results were not entirely as predicted. Regression lines plotting scores one standard deviation above and below the mean of each independent variable are presented in Figures 1, 2, 3, and 4 to assist in the interpretation of the results. The interaction term using either need for achievement (Figure 1) or need for autonomy (Figure 2) did not significantly increase explained variance in turnover. However, the interactions between job scope and the needs for achievement (Figure 3) and autonomy (Figure 4) were significantly related to absenteeism incidents. As expected, the number of absenteeism incidents decreased for employees with a high need for autonomy as job scope increased. In contrast, the highest absenteeism for high need achievers was

**FIGURE 1**

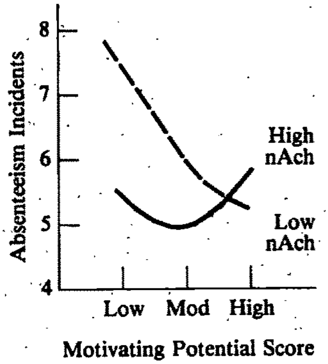
**Relationship Between Motivating Potential Score, Need for Achievement, and Turnover**



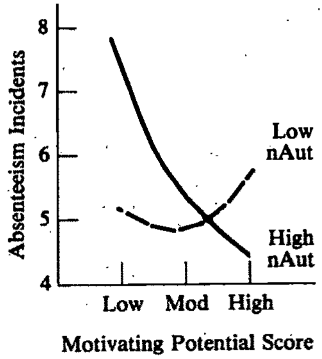
## FIGURE 2
## Relationship Between Motivating Potential Score, Need for Autonomy, and Turnover



## FIGURE 3
## Relationship Between Motivating Potential Score, Need for Achievement, and Absenteeism Incidents



## FIGURE 4
## Relationship Between Motivating Potential Score, Need for Autonomy, and Absenteeism Incidents



found on high scope jobs, and absenteeism decreased for low need achievers as job scope increased.

Finally, the squared job scope terms were significantly related to turnover and absenteeism incidents in all four analyses. The increment to $R^2$ attributable to the curvilinear term was generally small, ranging from .007 to .018. However, the significance of this term across analyses suggests that the relationship between perceived job scope and turnover and absenteeism was not linear. In all polynomial equations, the linear effect coefficient for job scope was negative, and the curvature effect coefficient was positive.

## Discussion

The results of this study provide additional empirical information to the growing literature on job design, as well as the literature on employee withdrawal behavior. Although job design theorists have long suggested that the motivating potential of tasks has important implications for employee behavior (Hackman & Oldham, 1976), research examining the impact of task characteristics on job satisfaction has far exceeded studies that have investigated actual behaviors such as turnover and absenteeism. The findings of this study help fill this gap.

The general pattern of results with respect to the influence of job scope on withdrawal behaviors is consistent with previous research. As expected, job scope was significantly related to both turnover and absenteeism. The nature of the task itself has been found in previous research to be a major influence on employee affective reactions at work. Employee affective reactions to the job are a major component of most theoretical models of turnover and absenteeism (Mobley et al., 1979; Steers & Rhodes, 1978) and thus provide a theoretical linkage between task characteristics and turnover and absenteeism. The generally weak direct relationships found between perceived job scope and turnover and absenteeism may be attributable to the failure to take such affective reactions into account in the present study and the failure to consider the numerous situational factors that may constrain an employee from acting on his or her behavioral intentions.

The influence of employee need strengths on turnover and absenteeism is much less clear. The finding that the needs for achievement and autonomy had a small but significant direct influence on turnover is generally consistent with other recent studies (Bernardin, 1977; Mowday et al., 1978), although other studies have failed to support this relationship (Mowday et al., 1979). The influence of personality characteristics on absenteeism has not been extensively studied, but the present results are consistent with the few existing studies that suggest that personal characteristics may influence the propensity to be absent (Bernardin, 1977).

The moderating influence of employee need strengths on the job scope-withdrawal behavior relationships found in the present study adds to the already confusing picture existing in the literature. The lack of any significant impact of such interactions on turnover is consistent with the recent work of Katerberg et al. (1978) but not Mowday et al. (1979). Moreover, the finding that employee need strengths moderated the job scope–absenteeism relationships is consistent with theory, but not with the recent empirical findings of Hackman and Oldham (1976). Finally, the finding that need for achievement moderated the job scope–absenteeism relationship in a direction opposite to that predicted is inconsistent with theory but not previous research. Hackman, Pearce, and Wolfe (1978), for example, found that absenteeism increased for clerical employees with high growth needs who had their jobs enriched. In addition, Stone, Mowday, and Porter (1977) found a significantly stronger relationship between job scope and job satisfaction for employees with a low need for achievement than for employees with a high need for achievement. Both of these studies would appear to be inconsistent with the work of Steers and Spencer (1977), who found that employees with a high need for achievement perform better on jobs high in scope than on jobs low in scope.

The accumulated evidence on the moderating influence of employee need strengths on the job scope–employee behavior relationship hardly inspires confidence in the present understanding of this area. One problem in interpreting the results of previous research is that investigators have used quite different measures of employee personality characteristics, although contradictory results also have been found when the same instrument has been used. Greater consistency in the personality constructs and measures used in future investigations may help overcome, but not eliminate entirely, the problems involved in interpreting previous research. Future research and theory may also need to reconsider the role of employee withdrawal behaviors in organizations. The tendency in the past has been to consider both turnover and absenteeism as negative influences on organizational effectiveness. As Staw and Oldham (1978) have suggested, however, such a narrow view may have resulted in overlooking the role of organizational withdrawal from an employee perspective. It is possible, for example, that absenteeism provides a mechanism for employees to cope with the increasing pressures associated with high scope jobs or for employees with growth needs to adapt to less challenging work. Clarification of the theoretical role of withdrawal behaviors in organizations may be a necessary step in developing a greater understanding of how these behaviors relate to both task characteristics and employee need strengths.

The finding that the squared job scope term added a small but significant portion of the variance in both turnover and absenteeism replicates the earlier findings of Champoux (1980), who studied job satisfaction. The implication of this finding is that the benefits to be derived in terms of reduced absenteeism and turnover from increasing the motivating potential of the job may increase at a decreasing rate. In other words, the marginal benefit of increasing the scope of jobs decreases at high levels of job scope and may disappear entirely at extreme levels of job scope. Additional research on a variety of jobs and occupations will be necessary before the nature of this curvilinear relationship is understood fully.

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# NOTES ABOUT AUTHORS

*Seymour Adler* is a lecturer in Organizational Behavior at the Faculty of Management, Tel Aviv University (Graduate School of Business Administration, Tel Aviv University, P.O.B. 39010, Ramat-Aviv, Tel Aviv). During the 1980-81 school year, he was a Visiting Assistant Professor in the Department of Psychological Sciences at Purdue University. He received his Ph.D. in Industrial Psychology from New York University. Dr. Adler's current research interests include attributional and social influence processes in organizations, career development, and personnel selection. He also has extensive consulting experience, particularly in the application of the assessment center and similar simulation-based assessment methods.

*Peter Allan* is Chief, Research and Analysis, of the New York City Department of Personnel, responsible for supervising research into various areas of personnel management (1482 15th Street, Fort Lee, NJ 07024). He also is Adjunct Professor of Management at the Pace University Graduate School of Business. He holds a Ph.D. in Management from the New York University Graduate School of Business Administration. His publications have appeared in *Public Administration Review* and *Personnel Journal.*

*Joel Amernic* is an Associate Professor of Commerce at the University of Toronto. His background includes industrial experience and service as a professional accountant. The author or co-author of several articles in the accounting literature and a textbook, his current research interests center on the use of accounting data in the union-management relationship, accounting for foreign business operations, and on investigating attitudes and other characteristics of members of the accounting profession.

*Nissim Aranya* is a Senior Lecturer and head of the Accounting Program at the Faculty of Management, Tel-Aviv University, Israel. He is the author or co-author of several articles on organizational and professional commitment as well as on job satisfaction of accountants. His current research interests center on behavioral aspects of accounting and control systems in organizations and on the attitudes and personality characteristics of accountants.

*Philip H. Birnbaum* is an Associate Professor in the Graduate School of Business at Indiana University, Bloomington, Indiana (Administrative and Behavioral Studies, School of Business, Room 650, Indiana University, Bloomington, IN 47405). He received his Ph.D. from the University of Washington in 1975. He has been involved in a series of studies on scientific research groups and strategic planning in high technology companies.

*Donald P. Crane* is a Professor of Management in the College of Business Administration at Georgia State University. He received his B.S. degree in Industrial and Labor Relations from Cornell University and the M.B.A. and Ph.D. from Georgia State University. He held management positions with several major U.S. corporations in the fields of marketing and industrial relations. He is an active arbitrator of labor-management disputes and is a member of the National Academy of Arbitrators. Dr. Crane was a distinguished lecturer in Personnel and Labor Relations at the U.S. Army War College (Carlisle Barracks). He was a Manpower Fellow with the U.S. Department of Labor. He has performed research and published in the areas of personnel management, minority manpower development, career planning, and labor relations. The second edition of his textbook, *Personnel: The Management of Human Resources*, was released in 1979.

*Angelo DeNisi* received his Ph.D. in Industrial/Organizational Psychology from Purdue University. He is currently an Assistant Professor of Organizational Behavior at the University of South Carolina (College of Business Administration, University of South Carolina, Columbia, SC 29208). His research interests include job analysis, performance appraisal, bargaining behavior, and the general area of stereotypes and response bias.

*Bernard L. Dugoni* is a doctoral student in Industrial/Organizational Psychology at Purdue University. He has conducted research on topics of advertising, performance feedback, and work motivation. Currently he is developing feedback instruments to be used in performance appraisal.

*Charles N. Greene* is Professor of Personnel and Organizational Behavior, Graduate School of Business, Indiana University (Graduate School of Business, Indiana University, Bloomington, IN 47401). He received his Ph.D. from Ohio State University in 1969. He was formerly personnel manager at Owens-Corning Fiberglas Corporation and the N.C.R. Company. He has authored numerous publications in the areas of leadership, investigation of organizational and role-related variables, compensation, and causal modeling. Dr. Greene is a former President of the Midwest Academy of Management.

*Peter Grinyer* is Chairman of the Department of Economics and the Esmee Fairbairn Professor of Economics (Finance and Investment), St. Andrews University, Fife, Scotland (Department of Economics, University of St. Andrews, St. Salvator's College, St. Andrews, Fife KY16 9 AL, Scotland). He is Visiting Professor of Business Strategy, The City University Business School, London. Educated at Balliol College, Oxford, and subsequently at the London School of Economics where he obtained his doctorate, his early research and consulting was in the fields of applied economics and operational research. Since 1968 his work has been predominantly in the fields of corporate financial modeling, newly floated public companies, corporate planning and strategy, and organizational design.

*Kathryn Rudie Harrigan* is an Assistant Professor of Business Administration at Columbia University (Graduate School of Business, Uris Hall, Columbia University, New York, NY 10027). She formerly taught at the University of Texas at Dallas. She received the D.B.A. from Harvard University and was the 1979 recipient of the General Electric Award for Outstanding Research in Strategic Management. Dr. Harrigan was selected as IBM honorary research fellow by the American Association of University Women for her research concerning declining industries. Her current research includes industry structural dynamics, strategic planning, and corporate governance.

*Daniel R. Ilgen* is an Associate Professor in the Industrial/Organizational area of the Department of Psychological Sciences at Purdue University (Department of Psychological Sciences, Purdue University, West Lafayette, IN 47907). He received his Ph.D. in Industrial/Organizational Psychology from the University of Illinois. He spent a year as a visiting Assistant Professor at Illinois, followed by two years in the army as a member of the faculty of the U.S. Military Academy at West Point. In 1978-79 he was a visiting Associate Professor in the Graduate School of Business at the University of Washington, Seattle, Washington.

*Thomas A. Mahoney* is a Professor of Industrial Relations in the Graduate School of Business Administration at the University of Minnesota. Dr. Mahoney conducts research in industrial relations and organization theory/behavior, human resource planning and modeling, compensation and reward theory and administration.

*Renate R. Mai-Dalton* is an Assistant Professor of Organizational Behavior and Administration in the School of Business at the University of Kansas (School of Business, University of Kansas, 207 Summerfield Hall, Lawrence, KA 66045). She received her M.S. and Ph.D. degrees from the University of Washington. Her research, consulting, and teaching interests include leadership, organizational change, and decision making research. Formerly employed by German and U.S. corporations and governmental agencies, Dr. Mai-Dalton is interested in international research.

*John B. Miner* is Research Professor of Management and Industrial Relations in the College of Business Administration at Georgia State University (College of Business Administration, University Plaza, Georgia State University, Atlanta, GA 30303). He received the Ph.D. in Psychology from Princeton University in 1955. He previously served on the faculties of the Universities of Oregon and Maryland. He has held professional positions in business with Atlantic-Richfield and McKinsey and Company. His book, ***Theories of Organizational Behavior***, has been published recently by Dryden and a sequel, ***Theories of Organizational Process and Structure***, will be published in early 1982.

*James H. Morris* is an Assistant Professor of Organization Theory in the Graduate School of Business, University of Santa Clara (School of Business, The University of Santa Clara, Santa Clara, CA 95053). Professor Morris received his Ph.D. from the Graduate School of Management at the University of Oregon in 1977 and was on the faculty at the Graduate School of Business, University of Alabama during 1977-79. His research interests include role and commitment processes in work organizations.

*Richard T. Mowday* is an Assistant Professor of Management in the Graduate School of Management at the University of Oregon (Graduate School of Management, University of Oregon, Eugene, OR 97403). He received his Ph.D. in 1975 from the University of California, Irvine. He has published in a number of professional journals and has been active in both regional and national meetings of the Academy of Management. He currently is continuing his research on employee turnover and absenteeism and is investigating the influence of organizational commitment during the early employment period on subsequent withdrawal.

*Charles W. Mueller* received his Ph.D. in Sociology from the University of Wisconsin at Madison in 1973 and has spent his entire career there, starting in the fall of 1972. He is an Associate Professor of Sociology with specialties in statistics and methods.

*Philip M. Podsakoff* is a member of the faculty at the College of Administrative Sciences at The Ohio State University. He received his D.B.A. from Indiana University in 1980. Dr. Podsakoff's research interests include the study of employee satisfaction and performance, reward systems, social power and influence, regulatory processes in behavior, and a functional analysis of organizational behavior.

*James L. Price* received his Ph.D. in Sociology from Columbia University in 1962 and has taught at the University of Iowa since 1966 (Department of Sociology, University of Iowa, Iowa City, IA 52242). He now is a Professor of Sociology with specialties in organizations.

*J. Daniel Sherman* is a doctoral student in Administrative Studies at the University of Alabama. He received his B.S. from the University of Iowa and M.A. from Yale University. He is currently involved in research on organizational commitment, organizational design, and women in management.

*Daniel G. Spencer* is an Assistant Professor of Management in the School of Business at the University of Kansas. He received his Ph.D. in 1979 from the University of Oregon. He has written articles in the areas of job design and goal setting and currently is engaged in research on employee turnover and absenteeism.

*George E. Stevens* is an Assistant Professor of Management at Arizona State University. He received his D.B.A. from Kent State University in Organizational Behavior and Theory in 1979. Articles by Dr. Stevens have appeared in the *Academy of Management Journal, Organization and Administrative Sciences*, and the *Journal of College Placement*, among others. He is a member of the Academy of Management and the American Institute for Decision Sciences and has presented papers at meetings of both organizations.

*Jeremiah J. Sullivan* is an Assistant Professor of Business Communications in the University of Washington School of Business. He holds graduate degrees from New York University and the University of Washington. He is the author of two books, *Pacific Basin Enterprise and the Changing Law of the Sea* and *Foreign Investment in the U.S. Fishing Industry.*

*John F. Veiga* is an Associate Professor of Management at the University of Connecticut (Management and Administrative Sciences, School of Business Administration, The University of Connecticut, Storrs, CT 06268). His publications have appeared in the *Academy of Management Journal, Journal of Applied Psychology, Harvard Business Review*, and *Human Resources Management*. He is co-author of the *Dynamics of Organization Theory: Gaining a Macro Perspective* (with John Yanouzas). He is a director of the Eastern Division of The Academy of Management and Associate Editor of *Exchange: The Organizational Behavior Teaching Journal.* His current research includes the mobile manager, the plateaued manager, and the abrasive personality. He received his D.B.A. from Kent State University in 1971.

*Nan Weiner* is an Assistant Professor at The Ohio State University in the Faculty of Management Sciences and the Faculty of Labor and Human Resources (The Ohio State University, 1 Page Hall, 1810 College Road, Columbus, OH 43210). She received her Ph.D. in Industrial Relations from the University of Minnesota. Dr. Weiner's research interests include organization theory and compensation theory and administration.

*Masoud Yasai-Ardekani* is a Research Fellow in the Department of Economics, St. Andrews University, Fife, Scotland. Until September 1979 he was a Research Fellow in Business Strategy at The City University Business School, London. Born in Teheran, he was educated at the Imperial College of Science and Technology (Electrical Engineering) and subsequently at the City University Business School, where he obtained his M.Sc. and doctoral degrees. Dr. Yasai-Ardekani's interests extend from design of organizations through strategy to some aspects of business finance.

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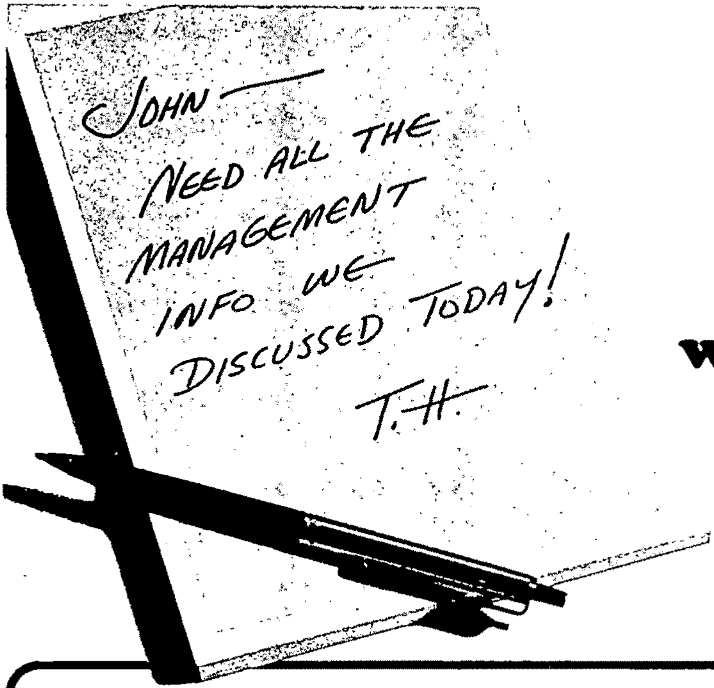

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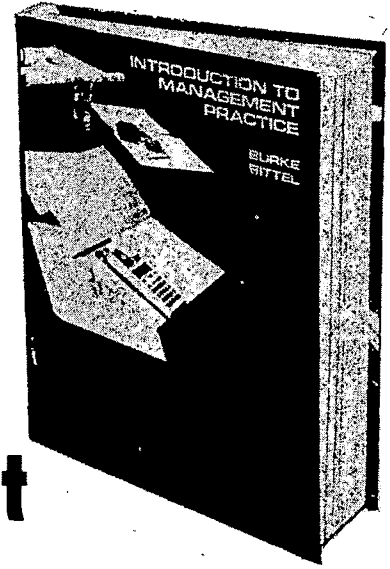

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# *Editorial Comment*

The editorship has reinforced an old adage, "You only learn when you think you know everything." The transition from an author to an editor has taught me patience, a much needed appreciation for the domain of management, a good dose of applying management principles to managing the *Journal*'s outstanding staff, and a profound respect for the professional commitment and dedication of an outstanding Editorial Review Board.

It has been an exciting time. It is difficult to describe the excitement of accepting the first manuscript and seeing the first issue in print. Those moments cannot be replaced. I have also experienced the joys of working with four of the best professional people in the business: Judy Satore, my first secretary at Penn State, and Jane Bell; Barbara Miner, our production editor; and Mary Bowdoin, our copy editor. The total support of my colleagues at Penn State and Southern Methodist University made these past three years most enjoyable.

I also want to express my sincere appreciation to the readers of *AMJ* for the opportunity to serve you.

## STATISTICAL SUMMARY

A summary of *Journal*'s operations for my editorship July 15, 1978, to November 2, 1981, are indicated below. This report represents an up-date of similar yearly reports that appeared in past December issues of *AMJ*.

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| 1. Total new manuscripts received | 1,278 |
| 2. Manuscripts accepted after all revisions | 236 |
| 3. Manuscripts rejected | 955 |
| 4. Manuscripts under revision | 79 |
| 5. Manuscripts under editorial review | 8 |
| 6. Average review time for original submission, in days | 36 |
| 7. Average review time for revisions, in days | 30 |
| 8. Currently accepting manuscripts for December, 1982 | |
| 9. Current backlog of accepted manuscripts | 61 |

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# Corporate-Level Strategy, Business-Level Strategy, and Firm Performance

**DONALD W. BEARD**
**University of Washington**
**GREGORY G. DESS**
**University of South Carolina**

*Corporate-level strategy and business-level strategy are operationalized in terms of* inter*industry and* intra*industry variation, respectively. Variables representing both levels of strategy are used in a regression model to explain variation in firm profit performance. Both kinds of variable are found to be significant in explaining variation in firm profitability.*

Theoretical literature in the business policy area has increasingly emphasized distinctions between two levels of organizational strategy: (1) corporate-level strategy, concerned with questions about what businesses to compete in, and (2) business-level strategy, concerned with questions of how to compete within a particular business. Differing conceptual schemes and associated analytic techniques have been proposed to aid top managers in making decisions about the two different kinds of strategy. Hofer and Schendel (1978) provide a recent literature review and a rationale for separating and sequencing these two kinds of strategic decisions.

Although business policy theory has been evolving in this direction, at least since Ansoff (1965), empirical research to test propositions derived from this theory has been limited. It is the purpose of this paper to present the results of such an empirical test. More specifically, the research presented here provides evidence about the relative importance of corporate-level strategy and business-level strategy in determining firm profit performance.

Conceptually, corporate-level strategy and business-level strategy are seen as corresponding, respectively, to *inter*industry and *intra*industry variations in business firms' strategies. The research design used single-industry firms as the unit of analysis. In this respect, the research is similar to the Profit Impact of Marketing Strategy (PIMS) project at Harvard

University, except that single-industry corporations rather than single-industry subunits of multi-industry firms are the primary unit of analysis. This design has the advantage that *inter*industry and *intra*industry strategic variation can be clearly distinguished and operationalized.

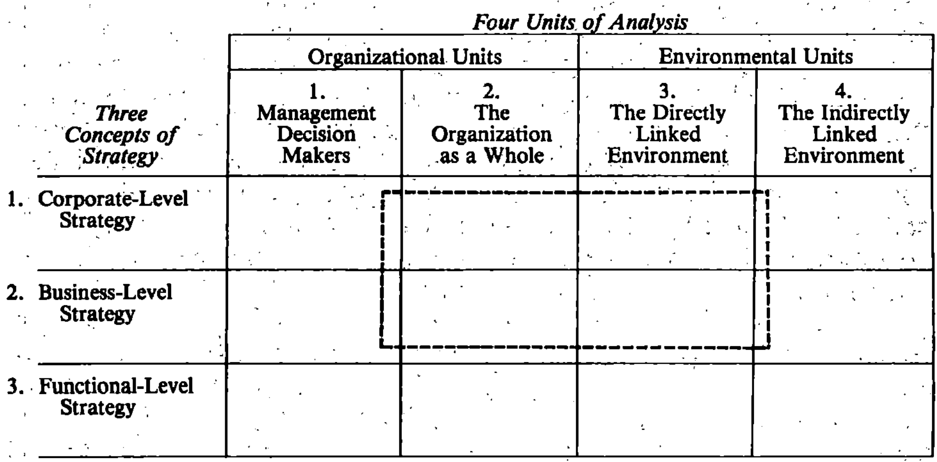
## CONCEPTS OF STRATEGY AND UNITS OF ANALYSIS

Organizational strategy is one of the broadest and most complex concepts used in studying organizations. Because the concept of strategy has been evolving rapidly in the business policy literature, it should be made clear at the outset what concepts of strategy have been used and what units of analysis have been studied. Figure 1 sets forth a framework that helps to specify the concern of this paper. Figure 1 cross-classifies three hierarchical levels of strategy with four hierarchical units of analysis. On the left in Figure 1, the concepts of strategy are arranged in hierarchical order from top to bottom, ranging from the most general concept, corporate-level strategy, to the least general concept, functional strategy. Across the top of Figure 1, the units of analysis are arranged in reverse hierarchical order, ranging from the smallest unit, management decision makers, to the largest unit, the indirectly linked environment. The concepts of direct and indirect linkages in an organization's environment as used in Figure 1 are analogous to the concepts of direct and indirect requirements in a Leontief-type input-output model. Leontief (1953), Chenery and Clark (1959), and Miernyk (1965) provide thorough discussions of the theory and applications of this model.

The research discussed below deals with only two concepts of strategy in Figure 1, corporate-level strategy and business-level strategy. The focus of the research is primarily on the organization as a whole, the second unit of

FIGURE 1

Three Concepts of Strategy and Four Units of Analysis



| | *Four Units of Analysis* | | | |
|---|---|---|---|---|
| | Organizational Units | | Environmental Units | |
| *Three Concepts of Strategy* | 1. Management Decision Makers | 2. The Organization as a Whole | 3. The Directly Linked Environment | 4. The Indirectly Linked Environment |
| 1. Corporate-Level Strategy | | | | |
| 2. Business-Level Strategy | | | | |
| 3. Functional-Level Strategy | | | | |

analysis in Figure 1, and the organization's directly linked environment, the third unit of analysis in Figure 1.

Although space limitations prevent much discussion of the distinctions made in Figure 1, it is important to elaborate briefly on the differences between the characteristics of strategic decisions or decision makers on one hand and the characteristics of an organization's strategy on the other hand. It is believed that organizations originate and change on the basis of creative, strategic decisions by individuals or groups occupying key organizational roles. Weick (1969), Child (1972), and Miles, Snow, Meyer, and Coleman (1978) develop this view more thoroughly. Strategic decision making is seen as a crucial part of the process by which organizations adapt to their environments.

It also is believed that those decisions that actually succeed in creating or changing organizations do so via complex iterative processes, which policy theorists subsume under the concept of strategy *implementation*. Andrews (1971) provides a broad theoretical overview of the strategy implementation process. Empirical work documenting the complex nature of strategic decision and implementation processes includes Cyert and March (1963), Bower (1970), Carter (1971), Pfeffer and Salancik (1974), and Mintzberg, Raisinghani, and Theoret (1976).

For purposes of the present study, a key assumption has been made about the relationship between organizational strategy and organizational performance. It was assumed that the effects of strategy on performance at a particular point in time, or during a particular period of time, are best studied in terms of the organization's *implemented strategy* at or during the relevant time. This means that the concept of strategy here is based on organizational characteristics that embody earlier strategic decision and implementation processes. Actual outcomes of decision and implementation activities are, of course, determined both by complex, iterative processes among decision makers within the organization and by interaction between the organization and its environment.

Concern will be only with the concepts of strategy enclosed within the dotted line of Figure 1—corporate-level strategy and business-level strategy. Corporate level strategy is conceived in terms of variation in the portfolio of industries in which a firm does business. Business-level strategy is conceived in terms of variation in the firm's strategic characteristics relative to the population of firms within the industries in which it does business. The verbal definitions employed closely follow Hofer and Schendel's (1978) concepts of corporate-level and business-level strategy. The operational measures of these concepts are discussed in more detail later in this paper.

*Corporate-level strategy* is defined in terms of variation in the deployment of a firm's resources among the portfolios of industries within which all business firms compete. Hofer and Schendel propound this view: "corporate-level strategy is concerned primarily with answering the question of what set of businesses should we be in. Consequently, scope and resource deployments among businesses are the primary components of corporate strategy'' (1978, p. 27). Thus, a firm's corporate-level strategy can be operationalized in terms of the distribution of firm assets, sales, employment, capital-budget, or other indexes of firm resources among the range of existing industries.

Most firms have simple corporate-level strategies, in these terms. They compete in only one industry among the hundreds that are possible. Other firms, however, such as the *Fortune* 500 largest United States industrial firms, typically participate in several industries, and their top managers must contend with the varied and conflicting demands of their industrially specialized subunits.

Because research interest in this paper is primarily in the question of how important variation in corporate-level strategy is relative to business-level strategy in explaining firm performance, the complex differences among industries will be represented quite abstractly. Differences in the average profitability among industries will be used to represent the overall differential in profit making opportunity among industries.

It is true that decisions about corporate-level strategy in multi-industry firms are based on a wide variety of information other than industry profitability and that these decisions affect many variables other than the distribution of firm assets among industries. Springer and Hofer (1980), for example, document the rich variety of decisions that have attended the evolution of General Electric's strategic planning process, which now includes distinct responsibilities and procedures at the corporate level and at the business level. Berry (1975) has identified General Electric as the second most diversified firm as of 1965 among the *Fortune* 500 largest industrials.

Lieberson and O'Connor (1972) have used variation in the average profitability of a subject firm's primary industry to assess the impact of differences in the firm's competitive environment upon firm performance—an approach similar to that of the present study. Other researchers have measured variation in a firm's corporate-level strategy in different ways. For example, Gort (1962) used the number of industries in a firm's portfolio to measure the diversity of a firm's corporate-level strategy, and Rumelt (1974) used a measure of the technical relatedness of the industries in which multi-industry firms competed. In another vein, Pitts (1977) has shown that marked structural differences exist at the corporate level between firms that have diversified via internal growth and those that have diversified by acquisition.

*Business-level strategy* is defined in terms of variation in firm characteristics relevant to competitive success or failure within a given industry. In this paper, a firm's competitively relevant, business-level characteristics are conceived exclusively in relative terms. That is, a firm would have a separate business-level strategy for each industry in which it competed, and the relevant characteristics of the firm's business-level strategy would be measured relative to the range and norms on each characteristic in each of its industries.

Hofer and Schendel again provide a succinct definitional statement:

> At the business level, strategy focuses on how to compete in a particular industry or product-market segment. Thus, distinctive competences and competitive advantage are usually the most important components of strategy at this level (1978, pp. 27, 28).

In the selection of variables to represent business-level strategy, focus was on variables that have been shown empirically to effect firm competitive performance. In this respect, less emphasis was put on a firm's mix of market segments and product line items within a particular industry than that used by Hofer and Schendel (1978). Instead, emphasis has been on variables that demonstrably tend to confer competitive advantage or disadvantage.

As with corporate-level strategy, business-level strategy can be operationalized in terms of a rich variety of measures. In two of the widest ranging studies, Schoeffler, Buzzell, and Heany (1974) and Schendel and Patton (1978), firm size relative to competitors and firm resource allocations to capital investment, advertising, and research relative to competitors were studied as strategic determinants of firm profitability. Taking a more financially oriented view, Hall and Weiss (1967) and Fisher and Hall (1969) found two risk factors, unpredictability of firm profitability and debt leverage, respectively, to explain considerable variance in firm profitability.

## RELEVANT THEORY AND RESEARCH

The main research question addressed in this paper is degree to which variation in a firm's corporate-level strategy and in its business-level strategy explains variation in its profit performance. Although this may seem to be a simple question, rarely has theory and research combined both the *inter*industry and *intra*industry perspectives in terms of definitions of corporate-level strategy and business-level strategy used here.

A great deal of theory and supporting research on the economics of industrial organization leaves little doubt that interindustry differences in structure and profitability are persistent over time and are similar among industrialized nations. This also means, of course, that there are differences in the average profitability of the firms competing in different industries. Scherer (1970), Weiss (1974), and Caves (1977) review this literature. The industrial organization field has focused largely on industrial aggregates of firms, however, rather than on the firms themselves. The industrial organization framework thus says little about either the range of variation in firm performance across or within industries or about other relatively large differences among firms in general or among firms competing within a single industry. Although business policy and other areas of business administration have focused on business firms as the unit of analysis, until recently they have produced little systematic or comprehensive research on variation in the environments in which individual firms compete.

The literature reviewed below is organized in three sections. First, a brief review of pivotal works contributing to the evolution of separate, hierarchical concepts of strategy will be presented. These works provide more background on the concepts of corporate-level strategy and business-level strategy set forth above. The remaining two sections cover the empirical research from which the hypotheses of the present research derive. These sections discuss evidence on relationships between firm profit performance and both corporate-level strategy and business-level strategy, respectively.

### Corporate-level and Business-level Concepts of Strategy

Ansoff was among the first to conceptualize different levels of organizational decision making. Ansoff saw three levels of decisions facing the organization's decision makers: *strategic decisions*—"the selection of product mix and markets...an impedence match between the firm and the environment," *administrative decisions*—"structuring a firm's resources to maximize performance potential," and *operating decisions*—"maximize the efficiency of the firm's resource conversion process" (1965, pp. 5, 6). Ansoff's first two types of strategy roughly approximate the concepts of corporate-level and business-level strategy, respectively, that are used in the present research.

Authors in the Harvard Business School tradition (Levitt, 1960; Andrews, 1971; Uyterhoeven, Ackerman, & Rosenblum, 1977; Christensen, Andrews, & Bower, 1978) have recognized two similar levels of strategy. Andrews, for example, defined corporate strategy as "the pattern of major objectives, purposes, or goals and essential policies and plans for achieving those goals stated in such a way as to define what business the company is in or is to be in and the kind of company it is or is to be" (1971, p. 25). The decision on what business the company is in or is to be in clearly approximates the concept of corporate-level strategy used here. The decision on what kind of company it is or is to be is too vague to be easily interpreted, but it could be seen as incorporating the concept of business-level strategy.

Vancil and Lorange (1975) define three levels of strategy that parallel those of the present study. They view strategic planning in diversified companies as moving through three cycles: setting corporate objectives at the top, setting consonant business objectives and goals in the divisions, and establishing the required action programs at the functional level.

Miles et al. (1978) identify three broad types of problems facing organizations: the entrepreneurial problem, the engineering problem, and the administrative problem. Solving the entrepreneurial problem in their model is equivalent to decisions on corporate-level strategy in presently used terms, and the latter two types of problems fit loosely with the concept of business-level strategy.

Hofer and Schendel (1978) prescribe different analytic strategic tasks at the corporate level and the business level. They see the principal task of analysis at the corporate level as evaluating the relative attractiveness of business(es) in the firm's portfolio and the principal tasks of analysis at the business-level as assessing the stage of the product life cycle and the firm's competitive position—within each relevant business. Hofer and Schendel's (1978) definitions are the most specific, and theirs are followed closely in this paper.

### Corporate-level Strategy and Firm Performance

Empirical research on relationships between corporate-level strategy and firm performance is discussed in two parts below. The first part concerns effects of the quantity and type of diversity in a firm's business portfolio on its profit performance. The second part concerns effects of variation in industry on firm profit performance.

Although some theoretical reasons can be advanced that the quantity of industrial diversification per se may affect business firms' profitability, empirical research thus far indicates that little relationship exists between diversity and profitability. Rhoades (1973) suggested that diversified firms might create barriers to entry to various industries in two ways: first, by using profits from one industry to subsidize predatory pricing in another industry and, second, by obscuring attractive returns in one or more of their industries through consolidated financial reporting. Rhoades' (1973) initial research, based on 1963 data for a sample of 244 manufacturing industries—four digit Standard Industrial Classifications (SIC)—showed some modest support for this view. However, Rhoades (1974) subsequently developed three additional measures of industry diversity using improved detail in data for 1967 published by the U.S. Census Bureau. The data allowed measurement of firm diversification in terms of both (a) the number of industries in which firms competed and (b) the proportion of firms' sales outside their primary industry. In the second study, he found a modest negative relationship between diversity and profitability. Rhoades (1974) attributed the contradictory results of the two studies more to differences in their levels of industrial aggregation than to their differences in diversification measurement.

Several studies using large U.S. manufacturing firms as the unit of analysis have found no relationship between diversity and profitability. Gort's (1962) work is one of the most comprehensive studies available on this subject. In a sample of 100 of the 200 largest manufacturing firms in the United States in 1954, including data for the years 1947 through 1954, he found virtually no correlation between return on net worth and two measures of firm diversification.

Gort (1962) did find a minimally significant positive correlation between firm growth in assets between 1939 and 1954 and diversification in the latter year. Berry (1975) supported this result in a sample including nearly all of the 500 largest U.S. manufacturing firms and including data for

1960 and 1965. Berry found low positive associations between growth in corporate assets in this 5-year period and several measures of growth in corporate diversification. However, the regressions as a whole explained little variance in corporate growth. Using a sample of approximately 300 of the largest U.S. manufacturing firms, Rumelt (1977) regressed Berry's measures of firm diversity in 1960 and in 1965 against firm profitability in these years and found no significant relationship.

A second kind of evidence about corporate-level strategy is especially relevant to the present research design. This is evidence as to the effect of variation in the average profitability of industries on the profitability of firms competing within them. On the average, of course, the weighted average for all firms in an industry gives the industry's profitability, and much of this variation in industry profitability can be explained by variation in industrial market structure. However, individual firms within a given industry clearly vary markedly in their profitability, and thus variation in profitability among firms can be explained only partially by variations in the industry or industries in which they compete. The main research interest here concerns both how much of an individual firm's profitability can be explained by its industry compared to other industries *and* how much can be explained by the firm's strategy compared to other firms' strategies within its particular industry.

Rumelt (1977) found specialized firms to be the most profitable, relatively speaking, when his sample firms' performance was controlled for the profitability of their differing industries. Firms with technically related portfolios dropped to average relative to their industries, and firms with unrelated portfolios remained the least profitable in both relative and absolute terms. The latter results add insight on Rumelt's earlier results as well as provide evidence of the positive effects of industry profitability on firm profitability.

Lieberson and O'Connor (1972) studied a sample of listed firms over the period 1946 to 1965. They found that variation in firms' primary industry explained 20 to 30 percent of the variation in their profitability and growth. Lieberson and O'Connor's additional finding that variation in the firms themselves accounted for much of the remaining variation in firm performance is also important. Because of Lieberson and O'Connor's (1972) unorthodox method of partitioning variance, the validity of their findings is difficult to assess.

Beard and Dess (1979) obtained results similar to those of Lieberson and O'Connor. Both industry return on assets and industry return on equity proved to be significant predictors of the corresponding measures of firm profitability. In addition, intraindustry variables were found to be significant.

## Business-level Strategy and Firm Performance

The review of research on relationships between business-level strategy and firm performance is selective. Business-level strategic variables for literature review and for further research have been chosen on the basis of four criteria. The first and most important criterion was that the business-level strategy variables have an empirical tradition showing a relationship with firm performance. This is consistent with the definition of business-level strategy above, which stresses differences conferring competitive advantage or disadvantage among the competitors within a given industry. A second criterion stemmed from practical resource constraints on the research. This was that data on the variables must be available in secondary sources for both firms and industries and that comparable measurement of profit performance and other variables be available for both units of analysis. A third criterion was that the variables be amenable to management control. A final criterion was that the variables must be characteristics of the organization as a whole that can be observed objectively across organizations in a given industry. This restriction eliminated perceptual or judgmental variables such as the uncertainty felt by management decision makers.

In applying these four criteria, three business-level strategy variables have been identified as most significant: relative size, debt leverage, and capital intensiveness.

Firm size in either absolute or relative terms is one of the most validated correlates of firm profit performance. For this reason it was chosen as the first business-level strategy variable. Research generally has shown a positive association between either absolute or relative firm size and firm profitability. This relationship is consistent with a large body of theory and research that demonstrates a wide variety of economies of scale. Scherer (1970) provides an extensive review of the literature in the industrial economics tradition, as of the date of publication. More recently, the Boston Consulting Group (1972) has documented the ubiquity of log-linear declines in unit costs and prices as cumulative output experience increases.

Relative firm size within a specific industry is the main concern of this paper and will be used as a measure of firm business-level strategy. Studies using market share as an independent variable in explaining firm profit performance include Shepherd (1972), Gale (1972, 1974), Schoeffler et al. (1974), Buzzell, Gale, and Sultan (1975), Winn (1975), and Bass, Cattin, and Whittink (1978). All of these studies included other independent variables as controls in addition to the market share variable, and all found a significant positive correlation between firm market share and firm profitability.

Shepherd (1972) was one of the first researchers to specify firm market share as an independent structural variable in attempting to explain firm profitability. In a study of over 200 firms among the *Fortune* 500 largest U.S. industrial firms during the period 1960 through 1969, Shepherd found firm market share to explain as much or more variance in these firms' profitability than the more traditional market structure variables. The latter included leading-firm group share of the market, firm asset size, firm advertising to sales ratio, firm growth rate, and industry barriers to entry.

Gale (1972) published a theoretically more complex study than Shepherd's (1972) of the relationships among firm profitability, firm market share, and several interaction and control variables. Gale's data base was a sample of over 100 firms from the *Standard and Poors Compustat, Annual Industrial Tapes* (1979) for the five years 1963 through 1967. Gale (1972) also found that firm market share exhibited a positive association with firm profitability, but that this association was quite variable due to interaction between market share and other independent variables, among which industry concentration was the strongest.

Gale's (1972) study is especially relevant to the research reported in this paper because his theoretical discussion and research on variability in market share's effects on profitability are important in explaining the present findings about this relationship. His theoretical treatment and results on the relationship between firm debt leverage and firm profitability are also germane to the present discussion of firm debt-leverage as a business-level strategy variable.

Winn (1975) conducted a study of firm profitability similar in design to the two just discussed except that firm size was measured absolutely rather than relatively. Winn's sample included nearly 800 firms in 79 industries from the *Standard and Poors Compustat, Annual Industrial Tapes* (1979) for the years 1960 and 1968. Winn's findings of a strong positive association between firm size and profitability supports the findings on market share cited above.

The studies of Gale (1974), Schoeffler et al. (1974), and Buzzell et al. (1975) are based on data gathered as part of the Harvard Business School's Profit Impact of Marketing Strategies (PIMS) project. The PIMS project data base as of 1972 included data from 57 large North American companies, about 620 of their single-industry subunits. As Buzzell et al. (1975) indicate, an advantage of this data base for studying market share is that businesses or markets are defined more narrowly than the U.S. SIC system usually allows.

The well known result of the PIMS research on market share and firm profitability is a strong positive association among the sample of single-industry subunits. However, the relative importance of market share compared to other independent variables has not been precisely quantified in published form. Schoeffler et al. (1974) report that a regression model developed from the PIMS data base explained 80 percent of the variance in return on investment among the 620 single-industry subunits. Gale (1974) includes regression results, but the coefficients are not standardized. It appears from the latter results that market share and capital intensiveness account for most of the variance in profitability and are about equal in importance among over 35 independent variables reported in Gale (1974).

The PIMS project approach of isolating business units of analysis competing within only one product-market strongly influenced the present study's design. However, the present design has relied on the SIC system in the United States Office of Management and Budget (1972) to define industries or markets. The research of Shepherd (1972), Gale (1972), and Winn (1975) reviewed above shows that this method is serviceable.

A final study using firm performance as a dependent variable and firm relative size as an independent variable, Bass et al. (1978), suggests another important qualification of the general market share-profit association. Overall, Bass et al. (1978) confirmed this association among a sample of 63 manufacturers of food, tobacco, and cosmetics. However, when the sample was grouped in 10 more internally homogeneous industry classifications, the market share variable was statistically significant and positive in only about half of the groups.

The second business-level strategy variable, capital intensiveness, also is well validated as a correlate of firm profitability. In this case, the relationship is generally negative. The theoretical context and explanation of this phenomenon are not always consistent, however. Winn (1975) presented and tested the hypothesis that the relationship between firm capital intensiveness and firm profitability is positive, not negative. His reasoning included two major points. First, capital intensiveness implies a relatively large minimum efficient scale, a barrier to entry. Second, consistent with the first, firm size and capital intensiveness are associated positively, and the latter relationship has a strong theoretical and empirical relationship with firm profitability, as discussed above.

However, Winn (1975) found a *negative* regression coefficient for firm capital intensiveness, as measured by the assets to sales ratio, in relation to profitability. Not only was this result statistically significant, but it explained 20 to 30 percent of the variance in firm profits. As mentioned above, this is precisely the result Schoeffler et al. (1974) and Gale (1974) obtained in their analyses of the PIMS data base. Further supporting evidence is provided by Rumelt (1974), who found predominantly vertically integrated firms to be among the most capital intensive and the least profitable.

Winn (1975) explained his finding of a negative association between firm capital intensiveness and firm profitability in terms of higher fixed operating costs that the former variable implies. He reasoned that relatively capital intensive firms were more subject to operating losses in times of cyclical downturn. Schoeffler et al. (1974) reasoned, in addition, that capital intensive firms tend to compete in markets with relatively standardized products where price cutting to obtain volume is frequent.

Hatten and Schendel (1977) provide further evidence of a negative association between firm capital intensiveness and profitability. In a sample of 13 major brewers, covering 20 years of data for most of them, they found a negative association which remained consistent and significant among a number of subgroups within their sample.

The final business-level strategy variable is debt leverage. Empirically, this variable has had a fairly consistent negative association with firm profitability, as was the case with capital intensiveness. However, in the case of firm debt leverage, the theoretical context is much more complex. The main complexity is that more than one source of risk can be identified empirically and that these separate risk elements appear to interact.

Gale (1972) and Baker (1973) distinguish between business risk and financial risk. Business risk tends to be a function of variability resulting from rather stable aspects of industry structure and technology. It thus is best studied in terms of interindustry variation. Interindustry variation of this kind is viewed in this paper as relevant primarily to corporate-level strategy. Financial risk, as measured by financial leverage, is then correspondingly best studied in terms of intraindustry variation. Thus, financial leverage and attendant risk should be measured relative to the norms and range within a particular industry. This is the approach taken in the present study.

Most studies of risk have focused on either business risk or financial risk. Only one study, to the authors' knowledge, has included both and considered them separately. Studies focusing on the variability and unpredictability of profits generally have found a positive relationship between this kind of business risk and rates of return. These include Conrad and Plotkin (1968) and Fisher and Hall (1969). Winn (1975) pursued a similar design in studying business risk. Rate of return among the almost 800 firms he studied was negatively related to the standard deviation and positively related to the skewness of this sample, just the opposite of what he had hypothesized. The coefficient of determination was small in this case, in contrast to earlier studies.

Studies focusing on financial risk as measured by the debt to equity ratio have found a negative association between this kind of risk and firm profitability. Arditti (1967), Hall and Weiss (1967), and Gale (1972) fall into this category. Baker (1973) obtained similar results using a single equation, ordinary least squares model. However, when Baker used a two equation, two stage least squares model, the relationship between debt leverage and rate of return became positive, as classical theory suggests it should. One could feel more confident in Baker's resolution of apparently contradictory findings if it had been replicated.

## HYPOTHESES AND METHOD

The research aims to provide a balanced test of the power of variation in firm corporate-level strategy and in firm business-level strategy in explaining variation in firm profitability. The correlational research design used involves testing the statistical significance and explanatory power of a linear regression model.

As mentioned in the introduction, the research is limited to single-industry firms. Thus, first the model will be specified as it was actually tested, i.e., the single-industry version of the model shown in equation (1). A brief discussion will show how the model can be generalized to include multi-industry firms. Such generalization is much easier in theory than in practice. Variation in corporate-level strategy has been measured in terms of the average profitability of the industry in which a firm does business. Variation in business-level strategy has been measured in terms of the firm's relative position within its particular industry on the three business-level strategic variables discussed above: sales size, capital intensiveness, and debt leverage.

### The Model

The hypotheses tested are specified in terms of an additive linear regression model:

$$Y_i = b_0 + b_1X_{1i} - b_2X_{2i} - b_3X_{3i} + b_4X_{4i} + U \qquad (1)$$

where:

$Y_i$ = the before tax return on total investment or on equity of the $i$th firm,

$X_{1i}$ = the before task return on total investment or on equity of the industry in which the $i$th firm competes,

$X_{2i}$ = the debt to equity ratio computed as the $i$th firm's ratio relative to the average ratio of the industry in which the $i$th firm competes,

$X_{3i}$ = the assets to sales ratio computed as the $i$th firm's ratio relative to the average ratio of the industry in which the $i$th firm competes,

$X_{4i}$ = the sales size of the $i$th firm relative to the average firm's sales size in the industry in which the $i$th firm competes,

$U$ = an error term accounting for unspecified variables,

$i$ = 1 through $n$, and

$n$ = the number of firms in the sample or population.

The signs of the coefficients in equation (1) indicate the direction of the relationships hypothesized to exist between the independent variables and the dependent variables.

To generalize the above regression model to include multi-industry firms one would need to substitute weighted averages on the independent variables for the single-industry variables shown in equation (1). The weights required to compute weighted averages on the independent variables could be specified as the proportions, $P_j$, of a given multi-industry firm's assets or other resources assignable to the various industries in which it does business. Algebraically the weights can be expressed as:

$$P_j = A_j/A \qquad (2)$$

where:

$P_j$ = the proportion of firm resources assignable to the $j$th industry,

$A_j$ = the absolute value of firm resources assignable to the $j$th industry,

$A$ = total firm resources $= \sum_{j} A_j$,

$j$ = 1 through $m$, and

$m$ = the number of industries in which investment is possible.

Given the weights, $P_j$, any business-level strategy variable can then be expressed as follows:

$$X_k = \sum_{j} P_j X_{kj}, \text{ or} \tag{3}$$

$$X_k = P_1 X_{k1} + P_2 X_{k2} + \ldots + P_m X_{km} \tag{4}$$

where:

$X_k$ = the $k$th business-level strategy variable,

$k$ = $i$ through $q$,

$q$ = the number of business-level strategy variables,

$P_j$ = the proportions used as industry weights as defined in equation (2) above,

$j$ = 1 through $m$, and

$m$ = the number of industries in which investment is possible.

The relatively large increase in resources required for actual implementation of the more general model in equations (3) and (4) compared to the single-industry model in equation (1) was judged not to be worthwhile.

In practice, accurate estimates of the proportion of firm assets allocated among the industries in which diversified firms did business were found to be difficult to obtain by survey procedures. This source of measurement error was judged to be major on the basis of a pilot survey. Therefore, the research was limited to a sample of listed firms that competed in only a single industry. The single-industry firms studied here are similar in many respects to the single-industry subunits of larger firms included in the Harvard Business School's PIMS project, as reported in Schoeffler et al. (1974), Gale (1974) and Buzzell et al. (1975).

### The Sample

The population sampled in the present study was the single-industry manufacturing firms included in Standard and Poors (1979). All firms included in the final sample were required to have been in one and the same industry for the years 1969 through 1974. A firm was considered to be a single-industry firm if, and only if, during the 1969-1974 period, a substantial majority, and in most cases all, of its sales could be clearly classified within one three digit SIC as defined by the U.S. Office of Management and Budget (1972).

The process of identifying the single-industry corporations as specified above was painstaking. Standard and Poors (1979) gives only the primary enterprise industrial classification of each firm in the Compustat file. Thus each firm drawn at random from this file was checked manually in Standard and Poors (1969 through 1974) which gives each four digit SIC in which a corporation does business. Only about one in six of the Compustat firms were found to be bona fide single-industry firms in terms of the four digit SIC codes. A final sample of 40 single-industry Compustat firms was studied.

### Data, Measurement, and Analysis

Firm-level data required to compute the appropriate coefficients in equation (1) above were obtained from Standard and Poors (1979). Industry-level data required to compute the appropriate coefficients in equation (1) were obtained from U.S. Internal Revenue Service (1974 through 1979) and Troy (1973 through 1978). These sources of firm-level and industry-level data, respectively, provide a consistent set of accounting classifications across the reporting units and across the six years studied.

The years 1969 through 1974 were chosen for analysis because this was the most recent six year period for which the Internal Revenue Service data were published and because this period included an equal number of recession years and relatively full employment years. In 1971, 1972, and 1974, U.S. unemployment was between 5.5 and 6.0 percent. In 1969, 1970, and 1973 unemployment was between 3.5 and 5.0 percent.

Operational measurement of the variables specified in equation (1) above is straightforward. Two measures of the dependent variable, firm profitability, were analyzed in parallel fashion. The first, firm return on equity (ROE), was measured as the ratio of profits before income taxes and extraordinary items to equity. The second, firm return on total investment (ROI), was measured as the ratio of profits before income taxes and extraordinary items plus interest to year-end total investment.

Concerning measurement of the independent variables, the appropriate *industry* profitability measure ($X_1$, the corporate-level strategy variable), either return on equity (ROE) or return on total investment (ROI), was computed from data in the U.S. Internal Revenue Service (1974 through 1979) exactly as the corresponding firm profitability measure was computed. The remaining three independent variables, all business-level strategy variables, were measured in the same way regardless of which firm profitability measure was used as the dependent variable. All three were measured as firm-characteristics *relative* to industry norms. The relative debt leverage measure ($X_2$) used was the ratio of firm total debt to equity divided by the corresponding average ratio for all firms (corporate tax returns) in the appropriate industry. Similarly, the relative capital intensiveness measure ($X_3$) was the firm total assets to total sales ratio divided by the average ratio for all firms in the appropriate industry, and the relative sales size measure ($X_4$) was firm sales divided by the average sales of all firms in the appropriate industry.

The statistical analysis and hypothesis testing were done using a stepwise linear regression procedure. Independent variables were entered at each step in the order of their squared partial correlation with the dependent variable when all other independent variables were controlled. The minimum level of acceptable statistical significance for the regression equations tested was $p < .05$. The model was tested for each of the six years included in the study as well as for the six year average, with respect to both of the dependent variables, return on equity and return on investment.

### Reliability and Validity Issues

The pooling of firms in a sample, where these firms are in some important respects heterogeneous, has been accorded increasing critical attention recently. Hatten and Schendel (1977) and Bass et al. (1978) are the most germane to our study. The basic point of both studies is that, if regression coefficients of subgroups of firms within a population or sample differ significantly from those of the population or sample as a whole, the reliability of the latter coefficients is subject to question.

These studies make a useful methodological point and also serve to remind one of the complexities in the areas of organization-environment relationships and business policy. Nonetheless, it is believed that this methodological point leaves the reliability of representative samples such as the present one at a viable level. The above two critical studies additionally raise the important judgmental issue of what populations are most relevant in studying firm performance. This question clearly has many acceptable answers depending on the purposes and interests of the researchers.

Two important trade-offs are seen between the external validity of a sample of firms and the kind of internal homogeneity that Hatten and Schendel (1977) and Bass et al. (1978) have persuasively raised as a reliability criterion. First, as such homogeneity is sought, the size of the population of firms that the sample represents, and thus the generality of the results, diminishes. Second, the parsimony of the empirically supportable theory resulting is diminished, a cost of contingency or situational theories in general. Both articles discuss other, more statistically technical advantages and disadvantages of pursuing internal homogeneity in samples of firms. The present authors have opted to weigh the above kinds of external validity more heavily than the added reliability that internal homogeneity admittedly provides.

The present research design is believed to have a number of strengths. The sample is drawn from a large population of listed manufacturing firms. The single-industry firms are relatively homogeneous with respect to industrial diversity. Schoeffler et al.'s (1974) experience with single-industry subunits of large firms suggests that larger, diversified firms can usefully be represented as aggregates of units similar to the present ones. Thus the generality of current results is relatively wide.

In using only single-industry firms, in using industry profitability to control for interindustry variation, and in measuring firm variables exclusively in relation to industry norms, it is believed that the present research has done much to distinguish clearly between *inter*industry and *intra*-industry (i.e., firm) sources of variation, a significant confounding problem in most earlier studies of firm performance. The sample of 40 single-industry firms represents 38 separate industries as well. Because of this interindustry heterogeneity, the sample provides an adequate range for variation at this level of analysis.

Six years of data that are about equally split in terms of high and low points on the business cycle have been used, and reasonably consistent results for each year separately and in the aggregate have been developed. The results also are developed for two different performance measures. The replicability of the design leaves its reliability and validity open to relatively easy future testing.

## RESULTS

Results of the stepwise regression analysis are summarized in Tables 1 and 2. The former gives results when firm return on equity (ROE) is the dependent variable, and the latter gives parallel results when firm return on total investment (ROI) is the dependent variable.

The results shown in Tables 1 and 2 indicate that both corporate-level strategy and business-level strategy, as defined and measured here, are important in explaining variations in firm profitability. With respect to the measure of corporate-level strategy ($X_1$, industry profitability) the sign is positive in all equations in Tables 1 and 2. In a large majority of equations, $X_1$ is either first or second in explanatory power as indicated by either the standardized regression coefficients or the stepwise change in multiple $R^2$.

With respect to the three measures of business-level strategy (relative size, debt leverage, and capital intensiveness), one encounters both confirmation of some relationships symbolized in equation (1) and some unexpected results. The explanatory power of firm relative debt to equity, $X_2$, is surprising. $X_2$ has a negative sign in virtually all equations, as hypothesized in equation (1). It is also first or second in explanatory power in the large majority of equations. The sign of firm relative capital intensiveness, $X_3$, is negative as hypothesized in equation (1). Overall, $X_3$ rivals $X_2$ in explanatory power, but it is not as consistently high in this respect. The almost universally low explanatory power of firm relative sales size is a major surprise. Because the regression coefficients for $X_4$ are so close to zero, their sign is of no interest.

Turning now to the overall magnitude and statistical significance of the regression results, one can see in Table 1, where return on equity (ROE) is the dependent variable, that the multiple $R$s and associated $R^2$s exceed the $p < .05$ criteria on one or more steps in four of the seven equations. Results for two other equations, including the equation for the six year averages,

## TABLE 1

## Stepwise Regression Analysis of Firm Return on Equity (ROE), 1969-1974

| Regression Equation Coefficients and Variable | $X_i$ | Regression Equation Coefficients in Final Step: Unstandardized Regression Coefficients | Standard Errors | Standardized Regression Coefficients | Stepwise Multiple Correlation Coefficients and Statistical Significance: Stepwise Multiple $R$ | Significance of Multiple $R$ | Stepwise Multiple $R^2$ | Change in Multiple $R^2$ |
|---|---|---|---|---|---|---|---|---|
| *1969* | | | | | | | | |
| $b_0$, Constant | — | .212 | .112 | — | — | — | — | — |
| $b_1$, Industry Return on Equity | $X_1$ | 1.391 | .537 | .405 | .414 | .008 | .172 | .172 |
| $b_3$, Firm Relative Capital Intensiveness | $X_3$ | -.153 | .077 | -.297 | .514 | .003 | .264 | .093 |
| $b_2$, Firm Relative Debt to Equity | $X_2$ | -.033 | .051 | -.103 | .522 | .009 | .273 | .009 |
| $b_4$, Firm Relative Sales Size | $X_4$ | .000 | .000 | .042 | .524 | .021 | .274 | .002 |
| *1970* | | | | | | | | |
| $b_0$, Constant | — | .189 | .888 | — | — | — | — | — |
| $b_1$, Industry Return on Equity | $X_1$ | 1.550 | .428 | .527 | .451 | .004 | .203 | .203 |
| $b_3$, Firm Relative Capital Intensiveness | $X_3$ | -.139 | .076 | -.261 | .526 | .003 | .277 | .073 |
| $b_2$, Firm Relative Debt to Equity | $X_2$ | -.061 | .044 | -.202 | .559 | .003 | .313 | .036 |
| $b_4$, Firm Relative Sales Size | $X_4$ | -.000 | .000 | .073 | .564 | .008 | .318 | .005 |
| *1971* | | | | | | | | |
| $b_0$, Constant | — | .272 | .202 | — | — | — | — | — |
| $b_2$, Firm Relative Debt to Equity | $X_2$ | -.130 | .100 | -.212 | .190 | .239 | .036 | .036 |
| $b_1$, Industry Return on Equity | $X_1$ | .825 | .853 | .158 | .260 | .275 | .067 | .031 |
| $b_4$, Firm Relative Sales Size | $X_4$ | .001 | .001 | .128 | .283 | .386 | .080 | .012 |
| $b_3$, Firm Relative Capital Intensiveness | $X_3$ | .112 | .158 | -.115 | .304 | .478 | .093 | .013 |
| *1972* | | | | | | | | |
| $b_0$, Constant | — | .251 | .103 | — | — | — | — | — |
| $b_1$, Industry Return on Equity | $X_1$ | .838 | .519 | .254 | .292 | .068 | .085 | .085 |
| $b_3$, Firm Relative Capital Intensiveness | $X_3$ | -.092 | .060 | -.239 | .378 | .057 | .143 | .058 |
| $b_2$, Firm Relative Debt to Equity | $X_2$ | -.062 | .052 | -.185 | .418 | .072 | .175 | .031 |
| $b_4$, Firm Relative Sales Size | $X_4$ | -.000 | .000 | .077 | .424 | .129 | .180 | .006 |

## TABLE 1 (cont.)

| | | *Regression Equation Coefficients in Final Step* | | | *Stepwise Multiple Correlation Coefficients and Statistical Significance* | | | |
|---|---|---|---|---|---|---|---|---|
| *Regression Equation Coefficients and Variable* | $X_i$ | *Unstandardized Regression Coefficients* | *Standard Errors* | *Standardized Regression Coefficients* | *Stepwise Multiple R* | *Significance of Multiple R* | *Stepwise Multiple $R^2$* | *Change in Multiple $R^2$* |
| *1973* | | | | | | | | |
| $b_0$, Constant | — | .145 | .086 | — | — | — | — | — |
| $b_1$, Industry Return on Equity | $X_1$ | 1.148 | .460 | .396 | .356 | .024 | .126 | .126 |
| $b_4$, Firm Relative Sales Size | $X_4$ | −.069 | .060 | −.184 | .406 | .036 | .165 | .039 |
| $b_2$, Firm Relative Debt to Equity | $X_2$ | .037 | .052 | −.116 | .421 | .068 | .177 | .012 |
| $b_3$, Firm Relative Capital Intensiveness | $X_3$ | .000 | .000 | .057 | .425 | .128 | .180 | .003 |
| *1974* | | | | | | | | |
| $b_0$, Constant | — | .162 | .149 | — | — | — | — | — |
| $b_2$, Firm Relative Debt to Equity | $X_2$ | −.308 | .080 | −.530 | .490 | .001 | .240 | .240 |
| $b_1$, Industry Return on Equity | $X_1$ | 1.260 | .638 | .275 | .565 | .001 | .320 | .079 |
| $b_4$, Firm Relative Sales Size | $X_4$ | .001 | .006 | .171 | .590 | .001 | .348 | .029 |
| $b_3$, Firm Relative Capital Intensiveness | $X_3$ | −.007 | .068 | −.015 | .590 | .004 | .348 | .000 |
| *6-Year Average, 1969-1974* | | | | | | | | |
| $b_0$, Constant | — | .096 | .046 | — | — | — | — | — |
| $b_2$, Firm Relative Debt to Equity | $X_2$ | −.072 | .033 | −.344 | .291 | .068 | .085 | .085 |
| $b_1$, Industry Return on Equity | $X_1$ | .408 | .301 | .212 | .367 | .069 | .135 | .050 |
| $b_3$, Firm Relative Capital Intensiveness | $X_3$ | .000 | .000 | .141 | .393 | .106 | .154 | .019 |

## TABLE 2
## Stepwise Regression Analysis of Firm Return on Total Investment (ROI), 1969-1974

| | | *Regression Equation Coefficients in Final Step* | | | *Stepwise Multiple Correlation Coefficients and Statistical Significance* | | | |
|---|---|---|---|---|---|---|---|---|
| *Regression Equation Coefficients and Variable* | $X_i$ | *Unstandardized Regression Coefficients* | *Standard Errors* | *Standardized Regression Coefficients* | *Stepwise Multiple R* | *Significance of Multiple R* | *Stepwise Multiple $R^2$* | *Change in Multiple $R^2$* |
| *1969* | | | | | | | | |
| $b_0$, Constant | — | .234 | .068 | — | — | — | — | — |
| $b_3$, Firm relative capital intensiveness | $X_3$ | -.114 | .046 | -.360 | .422 | .007 | .178 | .178 |
| $b_2$, Firm relative debt to equity | $X_2$ | -.064 | .031 | -.320 | .466 | .011 | .217 | .039 |
| $b_1$, Industry return on investment | $X_1$ | .980 | .054 | .289 | .534 | .007 | .285 | .068 |
| $b_4$, Firm relative sales size | $X_4$ | .000 | .000 | .025 | .535 | .017 | .286 | .001 |
| *1970* | | | | | | | | |
| $b_0$, Constant | — | .163 | .059 | — | — | — | — | — |
| $b_1$, Industry return on equity | $X_1$ | 1.504 | .494 | .449 | .322 | .043 | .104 | .104 |
| $b_2$, Firm relative debt to equity | $X_2$ | -.064 | .028 | -.343 | .482 | .008 | .232 | .129 |
| $b_3$, Firm relative capital intensiveness | $X_3$ | -.100 | .048 | -.298 | .561 | .003 | .315 | .083 |
| $b_4$, Firm relative sales size | $X_4$ | .000 | .000 | .052 | .563 | .008 | .317 | .003 |
| *1971* | | | | | | | | |
| $b_0$, Constant | — | .250 | .114 | — | — | — | — | — |
| $b_2$, Firm relative debt to equity | $X_2$ | -.097 | .053 | -.293 | .273 | .088 | .075 | .075 |
| $b_3$, Firm relative capital intensiveness | $X_3$ | -.099 | .084 | -.188 | .329 | .170 | .108 | .034 |
| $b_1$, Industry return on equity | $X_1$ | .671 | .820 | .130 | .353 | .183 | .125 | .017 |
| $b_4$, Firm relative sales size | $X_4$ | .000 | .000 | .097 | .366 | .270 | .134 | .009 |
| *1972* | | | | | | | | |
| $b_0$, Constant | — | .250 | .067 | — | — | — | — | — |
| $b_2$, Firm relative debt to equity | $X_2$ | -.081 | .033 | -.356 | .363 | .021 | .132 | .132 |
| $b_3$, Firm relative capital intensiveness | $X_3$ | -.079 | .039 | -.302 | .478 | .008 | .228 | .096 |
| $b_1$, Industry return on equity | $X_1$ | .527 | .571 | .137 | .497 | .016 | .247 | .018 |
| $b_4$, Firm relative sales size | $X_4$ | .000 | .000 | .023 | .497 | .037 | .247 | .001 |

## TABLE 2 (cont.)

| Regression Equation Coefficients and Variable | $X_i$ | *Regression Equation Coefficients in Final Step* Unstandardized Regression Coefficients | Standard Errors | Standardized Regression Coefficients | *Stepwise Multiple Correlation Coefficients and Statistical Significance* Stepwise Multiple R | Significance of Multiple R | Stepwise Multiple $R^2$ | Change in Multiple $R^2$ |
|---|---|---|---|---|---|---|---|---|
| *1973* | | | | | | | | |
| $b_0$, Constant | — | .103 | .072 | — | — | — | — | — |
| $b_1$, Industry return on equity | $X_1$ | 1.252 | .625 | .320 | .249 | .122 | .062 | .062 |
| $b_2$, Firm relative debt to equity | $X_2$ | −.063 | .040 | −.257 | .366 | .070 | .134 | .072 |
| $b_3$, Firm relative capital intensiveness | $X_3$ | −.027 | .045 | −.093 | .377 | .133 | .142 | .008 |
| *1974* | | | | | | | | |
| $b_0$, Constant | — | .174 | .084 | — | — | — | — | — |
| $b_2$, Firm relative debt to equity | $X_2$ | −.121 | .040 | −.455 | .423 | .006 | .180 | .179 |
| $b_1$, Industry return on equity | $X_1$ | .577 | .634 | .139 | .449 | .016 | .202 | .022 |
| $b_3$, Firm relative capital intensiveness | $X_3$ | −.022 | .034 | −.099 | .459 | .035 | .211 | .009 |
| $b_4$, Firm relative sales size | $X_4$ | .000 | .000 | .081 | .466 | .066 | .217 | .006 |
| *6-Year Average, 1969-1974* | | | | | | | | |
| $b_0$, Constant | — | .195 | .068 | — | — | — | — | — |
| $b_2$, Firm relative debt to equity | $X_2$ | −.100 | .037 | −.420 | .398 | .011 | .158 | .158 |
| $b_1$, Industry return on equity | $X_1$ | .673 | .583 | .177 | .434 | .021 | .189 | .030 |
| $b_3$, Firm relative capital intensiveness | $X_3$ | −.044 | .043 | −.156 | .458 | .035 | .210 | .021 |
| $b_4$, Firm relative sales size | $X_4$ | .000 | .000 | .054 | .461 | .072 | .213 | .003 |

approach this level of significance, and the one remaining equation is clearly not significant.

The magnitude and significance of the results shown in Table 2, where return on total investment (ROI) is the dependent variable, are moderately stronger than those for ROE. In Table 2, the multiple *R*s and associated $R^2$s exceed the $p<.05$ criteria on one or more steps in five of the seven equations, including the equation for the six year averages. Of the remaining two equations, both approach significance on one step, but the latter two also lag the other five equations in the magnitude and significance of their multiple *R*s. The appropriate industry profitability variable ($X_1$) is stronger in explaining variance in ROE than it is in explaining variance in ROI.

The instability from year to year in the top three independent variables' relative explanatory power is noteworthy. This is, in part, a result of the statistical criterion used to sequence variables for stepwise entry into the regression equations. A pattern with respect to the general business cycle is also apparent, however. In years in which U.S. unemployment, a major coincident business cycle indicator, was below 5 percent (1969, 1970, and 1973), the appropriate industry profitability measure has the greatest explanatory power. In years in which U.S. unemployment exceeded 5 percent (1971, 1972, and 1974), relative firm debt to equity and relative firm capital intensiveness have the greatest explanatory power.

## DISCUSSION AND CONCLUSIONS

On the question of the importance of corporate-level strategy and business-level strategy in explaining firm profitability, the results indicate that both are important. In 10 of the 14 regression equations described in Tables 1 and 2, the appropriate industry return variable and either firm relative leverage or firm relative capital intensiveness (and most often both of the latter two) contribute appreciably to statistically significant multiple correlation coefficients.

As to which variable, corporate-level or business-level, is the more important in explaining firm profitability, one must exercise caution. If one looks at the two six year average equations, the standardized regression coefficients in both equations show consistent rankings of the independent variables. Firm relative debt to equity is the most important, and this variable combined with firm relative capital intensiveness exceeds the appropriate industry profitability index in explanatory power.

In Table 2, where firm ROI is the dependent variable, the single-year equations show that the two major business-level variables combined generally explain more variance in performance than does the industry return variable. However, this is not so clearly the case in Table 1, where firm ROE is the dependent variable. In three of the six years shown in Table 1, the industry ROE variable exceeds the two major business-level strategy variables in explanatory power. All three such years are relatively low unemployment years, suggesting that the general business cycle affects the relative importance of the independent variables.

The universal absence of any relationship between $X_4$, firm relative sales size, and either measure of profitability is an unanticipated result. However, this result fits well with Gale's (1972) discussion of the relationship between firm relative size and firm profitability, and it is consistent with his finding of a strong, positive interaction between firm market share and industry concentration. When concentration was high in Gale's study, market share was strongly correlated with profit. When concentration was low, market share was not strongly correlated with profit. These results are consistent with the theoretical view that collective monopoly power among major competitors is a major source of the profits associated with market share.

The present study's sample is certain to have smaller firms on the average than those based upon the *Fortune* 500 largest industrial firms such as Shepherd's (1972) study. Size data on the PIMS project participants suggest that their single-business subunits are also likely to be among the top oligopolists in the industries in which they compete. Although the present sample is drawn from the Compustat Annual Industrial Tapes, like Gale's (1972) and Winn's (1975) samples, the exclusion of multi-industry firms in the current study no doubt would result in the sample's containing smaller firms than theirs, on the average.

The great majority of the sample of single-industry firms were profitable during the six years studied. It thus appears that these firms generally had reasonably successful strategies. It appears likely, however, that they would compete on a more selective basis than do leading oligopolists. They thus would seem likely to specialize in serving particular market segments, producing only selected products, or serving restricted geographic areas. Hamermesh, Anderson, and Harris (1978) suggest that firms with small market shares must follow these kinds of specialization in order to succeed. If one could define the relevant competitive environments for these firms more precisely than the industry data allow, their relative size then would be likely to appear more important to their success.

On the question of how much of the variance in firm profit performance can be explained by the independent variables taken together, the results are encouraging but not entirely persuasive. In the 8 equations, out of the total of 14, in which statistical significance is high, more than a quarter of the variance in the dependent variable is explained. The next three most significant equations, which exceed or approximate the $p<.05$ significance level, explain between 15 and 20 percent of the variance in the dependent variable. Because of the aggregated nature of the three digit SICs used to provide industry data, one would expect higher coefficients of determination if more precise industry classifications could be employed.

The multiple coefficients of determination in Tables 1 and 2 are generally stronger in years of relatively low unemployment (1969, 1970, and

1973), although 1974, a high unemployment year, shows stronger results than 1973. The effects of the general business cycle on the regression results can be rationalized as follows. In years of rising employment and GNP, firms in any given industry are relatively equal in their ability to command increases in financial, human, and material resources needed to expand output. Under these conditions, the distribution of firm profitability around the industry mean is narrowed, and the mean provides a better approximation of each firm's profitability. In years of increasing unemployment and falling GNP, firms with relatively high fixed costs associated with higher debt and capital intensiveness suffer disproportionate drops in profitability compared to competitors with lower fixed costs. Under these conditions, the distribution of firm profit around the industry mean is wider, and the mean provides a less satisfactory approximation of each firm's profitability.

At any rate, it appears that business cycle effects are not transmitted proportionately among firms in a given industry. It also seems likely that controllable strategic variables, such as capital structure and capital intensiveness, account for wide variance in the business cycle's effects on the individual firms in a particular industry.

The present study's results support several tentative conclusions. First, variation in a firm's corporate-level strategy and in its business-level strategy both help to explain variation in firm profitability. Second, the relative importance of variation in corporate-level compared to business-level strategy in explaining firm profitability remains somewhat ambiguous on the basis of present results. On the face of it, the relative debt leverage and relative capital intensiveness dimensions of business-level strategy appear stronger than industry return. However, the latter is measured more crudely than the former two variables. Thus, a more discriminating measurement of industry-level variation might possibly tip the balance of explanatory power in favor of corporate-level strategy.

Third, relative firm size within a given industry does not hold up here as a powerful predictor of firm profitability. Differing populations of firms studied seem likely to account for the difference between the research results and the results of several studies discussed above. In competition among the few, the relative size proposition looks valid. In competition among the many, it does not.

Fourth, the average level of the multiple correlation coefficients and the statistical significance of the regression equations suggest that under study are variables important to understanding and predicting firm profitability. Nevertheless, these results suggest that room remains both for better measurement of our variables and for specification of additional explanatory variables.

Finally, the variability of the results over time argues for more attention in future research to sources of temporal variation. The effect of some strategic variables on a firm's profitability appears to vary with business cycle conditions or with other longitudinal changes in the business environment. Firm differences in business-level strategy such as firm capital structure and capital intensiveness appear to account for widely varying effects of environmental change on individual competitors within a given industry.

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# *Organizational Innovation: The Influence of Individual, Organizational, and Contextual Factors on Hospital Adoption of Technological and Administrative Innovations*[1]

**JOHN R. KIMBERLY**
**Yale University**
**MICHAEL J. EVANISKO**
**Bain and Company**

*Individual, organizational, and contextual variables were found to be much better predictors of hospital adoption of technological innovations than of administrative innovations. The two different types of innovation were found to be influenced by different variables. Organizational level variables, size in particular, were clearly the best predictors of both types of innovation.*

The general topic of adoption of innovation has inspired voluminous research aimed at explaining why one organization is more likely than another to adopt an innovation. Gordon, Kimberly, and MacEachron (1975), for example, noted that their review of the literature bearing on organizational innovation yielded more than 2,000 items, and Kelly and Kranzberg (1978) found more than 4,000 items in their analysis of research on technological innovation. Certainly there has been no lack of attention to the issue, and a variety of economic, political, psychological, sociological, and managerial perspectives has been brought to bear.

Despite—or perhaps because of—the involvement of a diverse group of researchers, results at the empirical level often are noncomparable and occasionally contradictory. At this point, the literature on innovation consists primarily of a number of relatively discrete empirical generalizations and hypotheses. Several authors with a variety of disciplinary backgrounds have attempted to summarize and synthesize the research in this area (Brewer, 1980; Kelly & Kranzberg, 1978; Kimberly, 1981; Nelson & Winter, 1977; Rogers & Shoemaker, 1971; Utterback, 1974; Zaltman, Duncan, & Holbek, 1973). Generally, they agree that although an impressive amount of empirical research has been carried out, much remains to be learned about the conditions for and consequences of innovation.

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## CONCEPTUAL OVERVIEW

Of interest here is innovation in the context of organizations. Three basic issues in previous work helped to frame the research reported in this paper. First, researchers have tended to focus on a single innovation or single class of innovations in their studies, thus raising the question of generalizability. Within a given organization, such as an automotive assembly plant, for example, is the adoption of new production technologies, new scheduling practices, and new training programs influenced by similar or different variables or classes of variables? Little is known about how much influence, if any, variability in type of innovation will have on adoption or whether different variables may have different explanatory roles depending on the type of innovation in question. This issue has been raised by Downs and Mohr (1976).

The second basic issue is related to the nature of the studies. Many studies—perhaps most—of innovation are either case studies or are based on sample sizes so small as to preclude the possibility of the application of multivariate analytic techniques. This is not to deny the central importance of case studies as sources of insight and testable hypotheses. Rather it is to indicate that systematic quantitative comparative analysis of adoption behavior focused on the relative significance of different classes of variables requires larger samples than traditionally have been used.

The third basic issue is that, at the very least, the literature suggests that organizational adoption is influenced by the characteristics of individual people—usually organizational leaders; by characteristics of the organization itself; and by characteristics of the context in which it operates and out of which it emerged. At the most general level, it can be argued that a number of variables within each of these three categories have been found empirically to be related to adoption behavior. There is little in the way of evidence, however, to suggest (a) which variables within the classes of factors are most important (in the sense of explaining variability in adoption behavior), (b) the relative explanatory power of each of the three classes, or (c) whether the relative importance of the variables—or the classes—may depend on the type of innovation under consideration. The literature leads one to believe that all three classes play a role, but it provides little evidence on primacy.

Those studies that have been comparative in nature have tended not to include all three classes of variables noted above. For example, the work of Hage and Aiken (1967) focused only on the relationship between organizational variables and innovation. The later work of Hage and Dewar (1973) focused on both individual and organizational variables and is particularly interesting because it underlines the importance of elite values in the adoption process and suggests that they may be more important determinants of adoption behavior than are organizational characteristics. One is not able, however, to estimate the importance of environmental factors from their study. The work of Baldridge and Burnham (1975) did include a limited number of variables from all three levels, but it clearly is an exception.

This paper addresses each of these three major issues. In brief, the intent was to examine the combined effects of individual, organizational, and contextual variables on organizational adoption of two types of innovation—one type directly related to the organization's core technology and the other related to administrative concerns—across a large number of organizations with the objective of moving toward a more comprehensive treatment of organizational innovation than heretofore has been found in the literature. No effort was made at the outset to develop *a* theory of organizational adoption of innovation and test it empirically. Rather, the strategy was to develop a number of bivariate hypotheses for variables that had been found in previous research to be significantly related to innovation adoption, and then to examine these posited relationships in a multivariate framework with two different types of innovation as dependent variables. This strategy was thus informed by previous research, was deliberately designed to include individual, organizational, and contextual factors, and was intended to capitalize on the advantages of comparative research. It thus was neither purely deductive nor purely inductive, the primary interest being to develop a more comprehensive set of analyses of innovation adoption than had been previously available in the literature.

## DESIGN OF THE RESEARCH

One way to move toward a general understanding of innovation adoption is through intensive analysis in one particular sector of the economy. Although the applicability of findings in one sector to those in another is clearly problematic, concentration of the research focus can help to identify and isolate factors that clarify the nature of the phenomenon in that sector and, at the very least, can be helpful in suggesting hypotheses that may be generalizable beyond that sector and tested in others. The research reported in this paper concentrates on the health sector and attempts to identify the relative contribution of a number of factors to an explanation of observed variability in adoption of both technological and administrative innovations by hospitals. Although hospitals certainly are not the only potential adopters of innovations in the health sector, they are major consumers of innovations in the health care arena.

Both technological and administrative innovations are included in the research. Innovations in medical (or, in more general terms, production process) technology are directly related to the diagnosis and treatment of disease, which together constitute the basic work activity or mission of the hospital. Administrative innovations, which in this study all involve the adoption of electronic data processing for a variety of internal information storage, retrieval, and analytical purposes, are only indirectly related to the basic work activity of the hospital and are more immediately related to its management.

Inclusion of these two kinds of innovations permits determination of the extent to which the kinds of factors that impinge on their adoption are similar or different, an approach that is not unlike Daft's (1978) "dual core" strategy. Given that production processes on the one hand and administrative processes on the other in hospitals involve different demands and constraints, and given that they may involve different decision making structures with decisions about innovation adoption perhaps being made by different individuals or groups of individuals, there is no reason to believe a priori that the factors explaining innovation adoption in the two cases will be identical. In fact, building on the argument advanced by Downs and Mohr (1976), the important distinction between technological and administrative innovations from the perspective of adoption research may not be so much that they serve different functions but that they imply potentially different decision making processes.

The data base used in the present research was developed by the Program on Organization and Technology at Cornell University. A detailed description of the study procedures and sample is available in Moch and Morse (1977). For present purposes it is important to note that data were collected from both the hospital administrator and the chief of medicine in each hospital in the study. This strategy had the advantage of tapping differing perspectives on some key issues and the additional advantage of providing estimates of reliability of responses on some others. These data were supplemented with data from the American Hospital Association Annual Survey of Hospitals.

The analyses reported in this paper thus used an existing data set. The availability of these data provided an opportunity to address a number of important research questions more comprehensively than they have been addressed previously. The inherent limitation in this situation, of course, is that additional variables could have been included and existing variables might have been conceptualized and measured differently had the study been designed expressly to address the questions of interest. In the view of the authors, the advantages of the existing data far outweighed the potential disadvantages.

### Dependent and Independent Variables

The measure of technological innovation is based on hospital responses regarding the presence or absence of 12 new developments in the area of the diagnosis, treatment, or prevention of respiratory disease. Although concentration on a single area inevitably raises questions about the generalizability of the findings, a strong case can be made that hospital response to innovation in respiratory disease technology is likely to be reasonably representative of response to innovation in medical technology in general because many illnesses that require surgery and, therefore, the services of an anesthesiologist, require respiratory disease technology for anesthesiology and for postoperative care. Furthermore, many illnesses carry respiratory complications which, in turn, require that the hospital have respiratory disease diagnostic and/or therapeutic capacities.

The 12 innovations were chosen from an initial inventory of some 300 items suggested by a group of 15 experts randomly selected from a panel of 75 individuals designated by the National Tuberculosis Association as being the leading experts in respiratory disease in the country. Following consultation with experts, this initial inventory was reduced to 83 items, and these 83 items were then rated by a second group of 24 experts selected randomly from the remaining 60 on the basis of variability in their initial importance, their current importance, the ease with which their benefits could be communicated, and the amount of philosophy change their use might be expected to entail. The selection of the final 12 innovations was made with the help of outside consultants on the basis of these ratings and additional criteria, including researchability and variability in cost, risk, and divisibility.

It is not unreasonable to expect that some innovations might be "better" than others, and that judgments about quality might influence adoption behavior. Although it was not possible to explore this issue in depth, the available data were examined in a preliminary fashion. To accomplish this, the rates of adoption of the four innovations rated highest on both initial and current importance by the expert panel were compared with those rated lowest on both. No significant differences were found. It was impossible to determine whether this means that hospitals do not distinguish among innovations on this dimension or that the expert judgments are questionable or that the right questions were not asked. In any case, these results did not encourage a distinction among the innovations on the basis of quality.

One of the innovations was a surgical procedure, two were new drugs, two were new techniques, and seven were new pieces of equipment. The innovations finally selected were Microaggregated $I^{131}$ for use in lung scanning, Venti mask (disposable), Spirometer, Plethysmograph, Esophaegal balloon, Ultrasonic nebulizer, Blood gas electrode system, Ethambutol, N-Acetylecysteine, LDH determinations, Mediastinoscopy, and Intermittent Positive Pressure Breathing machine (IPPB). The items ranged in cost from low to moderate, in risk to patient from almost none to moderately high, and across the spectrum of divisibility. No extremely costly items or items that were applicable only to highly esoteric diseases were included. Both the hospital administrator and the chief of medicine in each hospital in the sample were asked to indicate which of the 12 innovations, if any, had been purchased or leased by the hospital.

The measure of administrative innovation is based on hospital responses regarding the use of electronic data processing (EDP) for eight possible managerial functions. Coordination and control are two central functions of management, and the applications of EDP are innovations that can help managers perform both. Potential uses of EDP examined in the study were accounting, admissions, discharges, personnel records, payroll, medical records, research, and patient care. The hospital administrator was asked to indicate whether EDP was currently being used in the organization for any of these eight functions.

These measures of innovation are somewhat different from measures found elsewhere in the literature. For a discussion of the variety of operational definitions of the term found in the organizational literature, see Zaltman et al. (1973). The 12 technological and 8 administrative innovations forming the measures were defined as such in relation to an external standard, in contrast to other studies that have defined innovation in terms of a program or activity new to an organization or in terms of a product, practice, or idea perceived as new by the adopter (Aiken & Hage, 1971; Hage & Dewar, 1973; Rogers & Shoemaker, 1971). There is no question that *perceptions* of newness may influence adoption behavior. These perceptions, however, may vary from one organization to the next, and a definition that focuses on the field as opposed to the adopting unit is more suitable for comparative analysis if several organizations are involved. If the concern is with variability in adoption of innovations across organizations, the definition of what is innovative cannot hinge on the perceptions of the potential adopters. A definition independent of the perceptions or needs of any one organization is required.

For the purposes of the research reported here, extent of adoption behavior is operationally defined as the sum of the respective number of innovations adopted as reported by the hospital administrator. Downs and Mohr (1976) recently criticized the use of such a summated index on the grounds that to do so ignores variations in the characteristics of particular innovations and the possible influence of this variability on adoption decisions. Their point is well-taken. However, Guttman scale analyses of the patterns of adoption across hospitals yielded a coefficient of reproducibility of .92 for the medical innovation variable and a coefficient of reproducibility of .91 for the managerial innovation variable, the magnitudes of which indicate the tenability of the additive assumption underlying the innovation scales. When interest is in *patterns* of adoption and when there is both theoretical justification and empirical support for grouping innovations into categories that have some logical internal consistency, use of indices of adoption seems appropriate.

The correlation between the two innovation measures was .42, suggesting that hospitals that adopt technological innovations also tend to adopt administrative innovations. However, because the shared variance is only 18 percent, it can hardly be argued that the two are redundant.

To examine the extent to which the reports of the hospital administrator and those of the chief of medicine converge, the correlation between the number of medical innovations reported to be adopted by the hospital administrator and the number reported by the chief medical officer was calculated. It turned out to be .78. In addition, 16 case studies were carried out subsequent to the mail survey. The correlation between the hospital administrator responses and the observations of the field researcher was .75 and that between responses of the chief medical officer and the researcher's observations was .86. The reliability of the measure is attributable largely to the use of records, as opposed to recall, as the criterion for determining adoption.

### Predictors of Innovation: Individual Variables

Three clusters of predictors of adoption behavior were used—characteristics of organizational leaders, characteristics of organizations themselves, and characteristics of their contexts. The first category includes characteristics of individual people in positions of authority in the subject organization. Considerable debate is found in the literature concerning the effects of leaders on organizational outcomes. Perrow (1970), for example, argued forcefully that "leadership" approaches to organizational analysis represent a form of psychological reductionism and vastly understate the importance of systemic influences on organizational outcomes. Lieberson and O'Connor (1972) found that industry and company factors accounted for more variance in certain indicators of performance in large corporations than did leadership effects. And Salancik and Pfeffer (1977), in their study of mayors' effects on city budgets, found that leadership effects are constrained by factors such as the potency of organized interests, contextual factors over which the leader has virtually no control.

Other research, however, suggests that the characteristics of key organizational actors cannot be ignored. Baldridge and Burnham (1975), for example, observed that organizational position and role appeared to influence innovative behavior (innovation adoption was most strongly influenced by those with power, communication linkages, and with the ability to impose sanctions), a finding compatible with the evidence that those who allocate organizational resources influence innovation adoption (Wilson, 1966; Sapolsky, 1967; Hage and Dewar, 1973).

Given that both the chief of medicine (CM) and the hospital administrator (HA) occupy positions of authority, measures of theoretically relevant characteristics of each of these individuals were included in the analyses. The theoretical perspective within which the hypotheses about the effects of individual factors were framed posits a correspondence between the formal role that an individual plays in an organization and the kinds of interests that person is likely to advocate. Based on such a perspective, it is argued that a chief of medicine, whose formal role is to preside over the medical activities of the hospital, would be likely to champion innovations, in the hospital's core technology. A hospital administrator, on the other hand, would be likely to be particularly interested in innovations that promise to further managerial efficiency or effectiveness. It would be expected, therefore, that characteristics of the chief of medicine would be more strongly associated with the adoption of innovations in the core technology than in administration, whereas characteristics of the hospital administrator would be more strongly associated with adoption of administrative innovations than with innovations in the core technology.

Existing theoretical perspectives on adoption suggest the importance of four sets of individual level variables: the job tenure, cosmopolitanism, educational background, and nature of organizational involvement of leaders. A positive relationship generally has been found in adoption research between adoption behavior and length of leader service (Rogers & Shoemaker, 1971). Although this relationship may be curvilinear in the extreme, the argument is that longevity in the job is a surrogate for systemic legitimacy and for knowledge of how to navigate the political waters in order to obtain desired outcomes.

Alternatively, it could be argued that new leaders with fresh perspectives and unfettered by obligations to particular organizational constituencies might be more likely to advocate and support innovations. Thus, a negative relationship between job and adoption would be expected. In the absence of empirical support for this rival hypothesis, it is hypothesized here that the job tenure of the chief of medicine and hospital administrator would be positively related to adoption behavior. It thus was hypothesized that *HA tenure is positively related to administrative innovation and CM tenure is positively related to the adoption of technological innovations.*

Although there have been some exceptions (Counte & Kimberly, 1974), researchers generally have found that cosmopolitanism is associated with higher receptivity to innovation (Becker, 1970a, 1970b; Rogers & Shoemaker, 1971). Again, it was felt that the orientations of leaders in both the technical and administrative subsystems of the hospital might influence decisions about adoption. It was hypothesized that *HA cosmopolitanism is positively related to adoption of administrative innovations and CM cosmopolitanism is positively related to adoption of technological innovations*. These two variables measure the extent to which the hospital administrator and chief of medicine, respectively, have contacts with professional colleagues outside the immediate work setting. The rationale for this pair of relationships is that cosmopolitans would be more likely to be exposed to new developments in the field.

The educational background of leaders has been found consistently to be related to adoption behavior in previous research. The higher the level of education, the more receptive an individual has been found to be to innovation (Becker, 1970a, 1970b; Rogers & Shoemaker, 1971). Because there was no variance in educational levels for the chiefs of medicine—all were M.D.s—they were not included in the analyses. For hospital administrators, however, both the *level* and *substance* of their educational experience varied widely, and it was felt that both might influence adoption. In line with previous research, ***HA educational level was hypothesized to be positively related to adoption of both kinds of innovations.*** In the case of education substance, it was reasoned that hospital administrators trained specifically in administration might be expected to be more receptive to administrative innovation than would administrators with other kinds of educational backgrounds.

The final individual level variables were included based on the hypothesis that greater involvement in policy (as opposed to operations) is associated with receptivity to innovation (March & Simon, 1958; Cyert & March, 1963). Three variables reflect this involvement. HA committee participation reflects the extent to which the hospital administrator participates in a number of policy setting committees for medical matters, and it was hypothesized that the more extensive the participation, the more likely the hospital administrator would be coopted by the medical staff and hence the more receptive he would be to technological innovation. HA involvement in medical activities and CM involvement in administrative activities indicate the extent to which the hospital administrator and chief of medicine are more broadly involved in hospital activities than the stereotypes characterizing their respective roles would suggest. Operating theoretically in a fashion akin to the HA committee participation variable, it is posited that ***broader involvement in hospital affairs will be positively related to adoption behavior.***

### Predictors of Innovation: Organizational Variables

Many organizational researchers have argued that the structural characteristics of an organization significantly influence its adoption behavior. The contention is that certain features of organizations themselves either facilitate or encourage adoption of innovation. Five variables in particular consistently have been found to be related to adoption and therefore have been included in our analyses.

Nearly all researchers hold that centralization is important in a theoretical sense. Although the relationship between centralization and adoption of innovation has been found to be positive in some cases, in others the relationship has been negative. Rarely, if ever, has it been found to make no difference whatsoever. In the absence of a persuasive and comprehensive theory about the effects of centralization on innovation adoption, the evidence suggests that the nature of the relationship may depend on the type of innovation in question and its relationship to key decision makers. An innovation in the core technology where that technology is applied by professionals who are more or less autonomous, as in the case of physicians working in hospitals, might be adopted more frequently in decentralized authority structures. On the other hand, an innovation in the administrative subsystem might be expected to be adopted more frequently in a centralized authority structure, where the will of the chief executive can be more easily imposed. It thus was hypothesized that *centralization is negatively related to the adoption of innovations in the core technology and positively related to the adoption of administrative innovations.*

Specialization represents the number of different medical specialties found in the hospital. To the extent that large numbers of different specialities are linked to the hospital's core technology, it can be said to be highly specialized. Employment of a variety of specialists perforce provides access to broader knowledge of new ideas, techniques, and products. Thus one may expect to find *a positive relationship between specialization and the adoption of innovations in the core technology.* And because increasing the number of medical specialties presumably generated increasingly complex problems of coordination and control, one would expect to find *a positive relationship between specialization and the adoption of administrative innovations* (Aiken & Hage, 1971; Corwin, 1972; Hage & Aiken, 1967; Mytinger, 1968).

The third organizational level variable, *size, generally is held to be positively related to adoption.* Most frequently, this relationship is attributed to economies of scale, which enhance the feasibility of adoption (Baldridge & Burnham, 1975; Moch & Morse, 1977). A more complete theoretical treatment of size and its measurement is presented in the next section of the paper.

Functional differentiation represents the extent to which the hospital is divided into a number of subunits. *Functional differentiation generally is hypothesized as leading to increased adoption of innovations* (Hage & Aiken, 1967; Blau, 1973; Heydebrand, 1973). The rationale for a hypothesized positive relationship between functional differentiation and the adoption of administrative innovations is that problems of coordination and control are exacerbated when organizations are formally divided into larger numbers of functional units. Adoption of innovations in EDP represents one potential solution to these problems. The positive relationship hypothesized between functional differentiation and the adoption of technological innovations is based on the premise that a functionally differentiated organization creates multiple interest groups and multiple demands for elaboration of the core technology. Inasmuch as innovations in respiratory disease technology support developments in other medical technologies, it is posited that *organizations that are highly differentiated functionally will be adopters of technological innovations.*

The final organizational level variable, external integration, represents the extensiveness of a variety of mechanisms that increase the probability that information about innovations will enter the organizational system. Research done in cases in which the individual is the adopting unit (Coleman, Katz, & Menzel, 1966; Becker, 1970a, 1970b; Burt, 1973), generally finds communications to be central in the adoption process. Although little research has been done at the organizational level, *a positive relationship between external integration and hospital adoption of innovation* has been found (Kimberly, 1978). Building on this perspective, we hypothesized a positive relationship.

### Predictors of Innovation: Contextual Variables

The importance of the organization's environmental context for innovation has been acknowledged conceptually, but rarely examined empirically. The first contextual variable, competition, indicates whether there are other hospitals in the area. This variable was included because it is generally held by economists that *competition increases the likelihood of adoption of innovation* (Utterback, 1974). The second contextual variable, size of city, indicates whether the hospital is located in a rural or urban area. Although there is very little evidence, some researchers have used city size as a measure of environmental complexity (Heydebrand, 1973). There appears to be an implicit hypothesis that *the larger the city, the more likely an organization is to adopt innovations*, but this may be due to the correlation between city size and other variables. The final contextual variable is the age of the hospital. Although there is little evidence, based on the perspective of Stinchcombe (1965) it would seem reasonable to expect *a positive relationship between age and adoption behavior.* Older hospitals that have both a well-defined resource base and a demonstrated high survival potential might be expected to adopt innovations as a way of insuring their status in the community. (A complete description of the predictor variables is available from the first author.)

### Size and Innovation

Two questions about the role of size were examined prior to the overall analyses. The first question has to do with its theoretical relationship to adoption behavior. It is generally held that innovation adoption is positively related to organizational size, and a positive relationship has been found reasonably consistently at the empirical level. The factors that lie behind this relationship may not be the same in all cases, however. Theoretically, there are at least two alternatives. First, size and adoption behavior may be positively related because increasing size creates a "critical mass" which justifies the acquisition of particular innovations. From this perspective, it can be argued that increasing size *facilitates* adoption behavior. Those organizations with greater volumes of activity may simply be better able to afford innovations.

An alternative explanation is that for certain classes of innovation, organizational size *necessitates* adoption behavior. Just as organizations often tend to become differentiated and formalized in the face of increasing size as a means of rationalizing and coordinating their activities, it may be the case that certain administrative innovations become necessary as a result of increasing size. Although the argument about the facilitiating effects of size might be advanced in this case as well, the important distinction is that organizations may have little choice in the matter: increasing size may create uncertainties that demand innovative behavior. Thus, in a theoretical sense the effects of size may depend on the nature of the innovation in question. A positive relationship between size and adoption behavior should not be assumed. See Mohr (1969) and Thompson (1969) for empirical and theoretical work that involves a negative relationship.

The second question has to do with the measurement of size and consists of two basic problems. By far the most common measure in organizational research is the number of employees (Kimberly, 1976). With regard to hospitals, however, measures that have been used (in order of frequency) are number of beds (a measure of capacity), total assets (a measure of resources), and number of personnel (a measure of work force). Even these do not exhaust the range of possibilities. Moch (1976) and Moch and Morse (1977), for example, conceptualized size as input volume and measured it as the logarithm of the annual number of patient admissions. What, then, is the best measure for present purposes?

To answer this question intercorrelations were calculated for four alternative size measures: beds, total assets, total employees, and full-time equivalent employees (full-time employees plus one half of the number of part-time employees). These measures are highly related, with all correlations exceeding .85. Although this pattern of relationships should not be assumed to obtain in other settings (Child, 1973), the results suggest that use of any of the four alternative size measures (with the possible exception of total assets) could be justified on empirical grounds. Because the dominant trend of hospital researchers is to use the number of beds as the operational definition of size, that measure was used in the research reported here for the sake of comparability.

The second issue with regard to size has to do with the appropriateness of logarithmic transformations of size variables. The most common rationale for the log transform is to reduce the variance in the distribution of the values of size across observations. The implicit justification for the log transform is that when the values of one variable are highly skewed—as is often the case with size—the magnitude of its resulting correlation with other variables can be very strongly affected by extreme scores. In using the log of size in a correlational or regression analysis, one assumes a curvilinear relationship with other variables in the analysis. However, the assumption of curvilinearity is rarely discussed. It thus appears that organizational researchers often fail to recognize the theoretical import of the log transformation.

Researchers on occasion have demonstrated the existence of a curvilinear relationship between size and other organizational properties (Blau & Schoenherr, 1971; Child, 1973), and in the case of organizational innovation, it is conceivable that size is related to adoption behavior in a curvilinear fashion. If one subscribes to the critical mass perspective that organizations of varying sizes are able to "justify" various levels of innovation adoption, it appears reasonable that at the low end of the size distribution the relationship between adoption behavior would be approximately linear. At some point, however, organizations will have the critical mass necessary to acquire most or all innovations, and size increments beyond this level are not likely to lead to increased adoption. Over the entire range of size, then, the relationship may be curvilinear.

Curvilinearity exists when the correlation between a variable and the log of size exceeds the correlation between the raw size measure and that variable. Although this test for curvilinearity is rather straightforward, it is infrequently applied. To explore the issue of curvilinearity in the present sample, logged and unlogged size measures were correlated with both innovation measures. For each pair of correlations, the significance of the difference of correlations was computed as a test of the curvilinearity assumption. The results, which are presented in Table 1, suggest that ***the relationship between size and innovation depends on the particular type of innovation under consideration***. For innovations in medical technology, all four size measures when logged demonstrated significantly stronger relationships to innovation adoption than the unlogged measures. For administrative innovation, they did not.

**TABLE 1**
**t-Statistics for Differences Between Correlations of Innovation Measures with Size and Log of Size**

| | *Correlation Between Technological Innovation and* | | | *Correlation Between Administrative Innovation and* | | |
|---|---|---|---|---|---|---|
| | *Size Measure* | *Log of Size Measure* | *t-Statistic for Difference* | *Size Measure* | *Log of Size Measure* | *t-Statistic for Difference* |
| Beds | .70 | .75 | 2.96* | .52 | .52 | .00 |
| Total assets | .64 | .72 | 3.51** | .49 | .50 | .36 |
| Total employees | .67 | .75 | 4.10** | .52 | .53 | .40 |
| Full-time equivalent employees | .67 | .75 | 4.09** | .52 | .53 | .40 |

$^{*}p<.01$
$^{**}p<.001$

This difference is not unimportant and is used in subsequent analyses. The log of the number of beds is used as the size measure in analyses concerned with technological innovation, whereas the raw value is used in the analyses focusing on the adoption of administrative innovations. The larger issue, of course, is that logarithmic transformations should not be routinely used. They may be appropriate in some cases but not in others.

## RESULTS

The analyses focused on two distinct, but related questions. First, in the context of the bivariate hypotheses described earlier, what is the relative significance empirically of each of the individual, organizational, and contextual classes of variables? And, second, within classes and on an overall basis, which specific variables make the largest contribution to explained variance in each of the dependent variables when all other variables are held constant? The results from both questions, taken together, provide data on the extent to which different or similar variables account for adoption of the two types of innovation and provide indications of the relative strengths of individual, organizational, and contextual level explanations of variance in adoption behavior.

Eight multiple regression equations were estimated to assess the effects of the predictor variables both within and across classes. The first six regressions examine the effects of individual, organizational, and contextual variables separately on technological innovation and then on administrative innovation. The final two examine the combined effects of all variables on the two types of innovation. Table 2 presents the correlations among all variables included in these analyses.

## Technological Innovation

The first three regressions examine the separate effects of individual, organizational, and contextual factors on adoption of technological innovation, and the results are presented in Table 3.

The potential problem of multicollinearity in the regression results has not been ignored. Unfortunately, there is little consensus among statisticians on two critical operational points. First, what *level* of correlation among *how many* independent variables creates a "problem"? And, second, how should one interpret regression results in those situations in which the problem may exist? With regard to the former, Blau and Schoenherr (1971) used substantive interest as a general criterion for the inclusion of independent variables, although as a rule of thumb they did eliminate one independent variable in cases in which correlations exceeded .82. In the absence of other criteria, this solution does not seem unreasonable. With regard to the issue of interpretation, the reader is urged to use whatever caution(s) his or her own training and/or biases suggest.

With respect to the effects of individual level variables, the results suggest that technological innovation is positively affected when the hospital administrator is highly educated, does not participate extensively in committees dealing with matters of medical policy, is relatively heavily involved in medical activities, and has served in his role for a relatively long period of time, and also when the chief of medicine is relatively actively involved in administrative affairs.

The results, which in regression terms account for 21 percent of the variance in innovation, are somewhat counter-intuitive. The hospital administrator is a more central figure in the adoption of technological innovations than is the chief of medicine. Because the innovations examined are medical as opposed to administrative, it would not have been surprising had the chief of medicine had a more significant impact.

The regression results for the organizational level variables, which account for 62 percent of the variance in technological innovation, indicate

## TABLE 2
## Correlations Among All Variables
## ($N=210$)

| *Variables* | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* | *14* | *15* | *16* | *17* | *18* | *19* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Technological innovation | — | | | | | | | | | | | | | | | | | | |
| 2. Administrative innovation | .42 | — | | | | | | | | | | | | | | | | | |
| 3. HA tenure | .13 | .09 | — | | | | | | | | | | | | | | | | |
| 4. CM tenure | .01 | -.03 | -.11 | — | | | | | | | | | | | | | | | |
| 5. HA cosmopolitanism | .04 | .19 | .33 | -.06 | — | | | | | | | | | | | | | | |
| 6. CM cosmopolitanism | .11 | -.02 | -.07 | .01 | .00 | — | | | | | | | | | | | | | |
| 7. HA educational substance | .06 | .14 | -.25 | -.08 | -.04 | -.02 | — | | | | | | | | | | | | |
| 8. HA educational level | .23 | .26 | -.19 | -.11 | -.04 | .04 | .40 | — | | | | | | | | | | | |
| 9. HA committee participation | -.29 | -.15 | -.11 | .04 | -.07 | -.01 | -.06 | -.07 | — | | | | | | | | | | |
| 10. CM involvement in administrative activities | .20 | .04 | -.02 | .00 | -.02 | .16 | .02 | .11 | -.06 | — | | | | | | | | | |
| 11. HA involvement in medical activities | .12 | .10 | .05 | .00 | .11 | .07 | -.06 | -.10 | .08 | -.06 | — | | | | | | | | |
| 12. Centralization | -.38 | -.13 | -.07 | .02 | -.17 | -.08 | .00 | -.07 | .01 | -.08 | -.02 | — | | | | | | | |
| 13. Specialization | .70 | .46 | .19 | -.06 | .08 | .11 | .08 | .25 | -.36 | .10 | .08 | -.32 | — | | | | | | |
| 14. Size | .69 | .52 | .13 | .02 | .05 | .10 | .15 | .29 | -.32 | .12 | .10 | -.30 | .75 | — | | | | | |
| 15. Functional differentiation | .70 | .47 | .10 | -.03 | .07 | .08 | .13 | .31 | -.40 | .22 | .10 | -.29 | .72 | .77 | — | | | | |
| 16. External integration | .55 | .37 | .06 | .02 | .10 | .12 | .00 | .08 | -.18 | .21 | .05 | -.33 | .62 | .58 | .58 | — | | | |
| 17. Competition | .41 | .25 | .03 | -.05 | .02 | -.10 | .02 | .27 | -.17 | .04 | .06 | -.25 | .44 | .35 | .40 | .27 | — | | |
| 18. Size of city | .47 | .26 | .09 | -.02 | .01 | .02 | .08 | .19 | -.23 | .17 | .18 | -.18 | .56 | .47 | .51 | .44 | .42 | — | |
| 19. Age | .35 | .21 | .15 | .07 | .02 | .03 | .08 | .26 | -.19 | .06 | -.04 | -.22 | .52 | .50 | .49 | .33 | .28 | .30 | — |

## TABLE 3
## Results for Regression of Technological Innovation on Individual, Organizational, and Contextual Variables

| *Individual Variables* | | | *Organizational Variables* | | | *Contextual Variables* | | |
|---|---|---|---|---|---|---|---|---|
| *Variable* | *Beta* | *SE* | *Variable* | *Beta* | *SE* | *Variable* | *Beta* | *SE* |
| HA tenure | .17* | .070 | Centralization | –.14** | .046 | Competition | .21** | .065 |
| CM tenure | .06 | .064 | Specialization | .17* | .082 | Size of city | .33*** | .066 |
| HA cosmopolitanism | –.03 | .067 | Size (log of beds) | .34*** | .091 | Age | .19** | .062 |
| CM cosmopolitanism | .07 | .064 | Functional differentiation | .19* | .076 | | | |
| HA educational substance | .00 | .070 | External integration | .10 | .058 | | | |
| HA educational level | .25*** | .070 | | | | | | |
| HA committee participation | –.27*** | .064 | | | | | | |
| HA involvement in medical activities | .16** | .064 | | | | | | |
| CM involvement in administrative activities | .15* | .064 | | | | | | |
| $R^2 = .21$ | | | $R^2 = .62$ | | | $R^2 = .30$ | | |

*$p < .05$
**$p < .01$
***$p < .001$

## TABLE 4
## Results for Regression of Administrative Innovation on Individual, Organizational, and Contextual Variables

| *Individual Variables* | | | *Organizational Variables* | | | *Contextual Variables* | | |
|---|---|---|---|---|---|---|---|---|
| *Variable* | *Beta* | *SE* | *Variable* | *Beta* | *SE* | *Variable* | *Beta* | *SE* |
| HA tenure | .11 | .073 | Centralization | .05 | .063 | Competition | .16* | .074 |
| CM tenure | .05 | .067 | Specialization | .09 | .099 | Size of city | .14 | .075 |
| HA cosmopolitanism | .15* | .070 | Size | .34** | .104 | Age | .12 | .071 |
| CM cosmopolitanism | –.03 | .067 | Functional differentiation | .12 | .100 | | | |
| HA educational substance | .05 | .073 | External integration | .06 | .079 | | | |
| HA educational level | .27*** | .073 | | | | | | |
| HA committee participation | –.10 | .067 | | | | | | |
| HA involvement in medical activities | .13 | .067 | | | | | | |
| CM involvement in administrative activities | .02 | .067 | | | | | | |
| $R^2 = .15$ | | | $R^2 = .29$ | | | $R^2 = .10$ | | |

*$p < .05$
**$p < .01$
***$p < .001$

that the extent of integration into the hospital's external information environment is the only organizational level variable that does not account for unique variance in the dependent variable. The pattern and strength of the relationships reveal that high adopting hospitals tend to be large, are specialized, are highly differentiated, and have a tendency for decisions to be made near the level of the department heads.

All three contextual level variables have significant partial regression coefficients. The evidence suggests that high adopting hospitals tend to be located in urban areas, are faced with competition from at least one other hospital, and are older. These three contextual variables together account for 30 percent of the variance in technological innovation.

### Administrative Innovation

The next three regressions examine the effects of individual, organizational, and contextual factors on adoption of administrative innovation, and the results are presented in Table 4. Considering the individual level variables first, two explain significant, unique variance in adoption behavior. Adoption is positively affected when the hospital administrator is highly educated and cosmopolitan. None of the variables pertaining to the chief of medicine was significant. The individual level variables account for 15 percent of the variance in adoption of administrative innovations.

The influence of organizational variables on administrative innovation is considerably weaker than on technological innovation. Of the five, only organizational size accounted for unique variance in the dependent variable; the regression equation explains 29 percent of the variance in administrative innovation.

The contextual variables also are less effective predictors of administrative than of technological innovation, with only the presence of competition in the area having a significant partial regression coefficient. The regression equation accounts for 10 percent of the variance in administrative innovation, and adoption behavior is fostered when the hospital faces competition in the local area.

The results of these six regressions provide evidence with which to answer the question regarding the relative significance of the different classes of variables for each type of innovation. Although the independent variables are less effective predictors of administrative innovation than they are of technological innovations, the results underline the importance of the organizational level variables, which, for both dependent variables, account for twice the variance of the next best set of predictors. In terms of the question about *which* variables within the three classes explain variation in the two types of innovation, important differences apparently exist. The fact that both HA and CM involvement in their counterparts' activities enhanced adoption of technological but not administrative innovations suggests that the March and Simon hypothesis about the relationship between involvement in policy as opposed to operations and receptivity to innovation needs to be refined. In an organization such as a hospital where there is a dual authority structure and presumably high potential for conflict over resource allocation decisions, innovations in those areas that engage both subsystems—such as innovations in the core technology—are facilitated when leaders from each subsystem are actively involved in the affairs of the other subsystem. Such activity provides an opportunity for the kind of bargaining and negotiation required when potentially conflicting interests are at stake to take place.

Size was the only organizational factor enhancing adoption of administrative innovations, whereas it was one among several organizational factors enhancing adoption of technological innovations, suggesting a more complex organizational level explanation for the latter. Age and size of city were unrelated to adoption of administrative innovation but were related to adoption of technological innovation, again suggesting, though by no means confirming, the existence of different processes accounting for their adoption.

### Relative Importance of the Predictors

To what extent do specific individual, organizational, and contextual variables account for unique variance in each of the two dependent variables and what is their relative import when all three are considered simultaneously? For innovations in medical technology, the results for all 17 predictor variables are shown in Table 5. As the table shows, five variables explain a significant amount of unique variance in adoption behavior in a regression equation that accounts for 65 percent of the variance in adoption. The apparent dominance of the organizational variables discussed above

**TABLE 5**

**Results for Regression of Technological Innovation on All Variables**

| *Variable* | *Beta* | *SE* |
|---|---|---|
| HA tenure | .05 | .050 |
| CM tenure | .07 | .044 |
| HA cosmopolitanism | –.07 | .047 |
| CM cosmopolitanism | .00 | .045 |
| HA educational substance | .03 | .049 |
| HA educational level | .03 | .052 |
| HA committee participation | –.01 | .049 |
| HA involvement in medical activities | .04 | .046 |
| CM involvement in administrative activities | .05 | .046 |
| Centralization | –.15** | .047 |
| Specialization | .18* | .086 |
| Size (log of beds) | .39*** | .094 |
| Functional differentiation | .17* | .080 |
| External integration | .10 | .060 |
| Competition | .06 | .052 |
| Size of city | .00 | .057 |
| Age | –.15** | .053 |
| $R^2=.65$ | | |

$^{*}p<.05$
$^{**}p<.01$
$^{***}p<.001$

was confirmed; none of the nine individual variables was a significant predictor of innovation, and only one of the contextual variables was significant. Adoption of technological innovation tends to be most prevalent in organizations that are large, specialized, functionally differentiated, and decentralized.

Interpretation of the effects of age is more complex, as can be seen by comparing Table 3, which presents the results of the regression of technological innovation on the contextual level variables, with Table 5, which presents the results of the regression of technological innovation on all of the predictor variables. Although the zero-order correlation between adoption of technological innovations and hospital age is .35, the respective beta values in Tables 3 and 5 are .19 and -.15. As indicated in Cohen and Cohen (1975), a partial regression coefficient that falls outside the range from .00 to the value of the zero-order correlation between the independent and dependent variables (in this case, .35) indicates that net suppression is occurring. Because the beta value for age in Table 5 is negative, such a situation exists.

To examine the interpretive significance of net suppression in the absence of a theoretical perspective that had predicted it a priori, a series of multiple regression equations in which age and each of the other predictor variables were paired was estimated. These analyses revealed that size and specialization suppress a portion of the variance in age that is irrelevant to the adoption of technological innovations. As a result, removing the portion of the variance in age associated with size and specialization results in a negative relationship between age and adoption of technological innovations.

The explanation of this phenomenon, albeit post hoc, concerns the incentive structures for innovation during the course of an organization's life cycle. As suggested earlier, a possible explanation of hospital adoption behavior for innovations is that the increased scope of a hospital's activities and workload *facilitates* adoption. Size and, consequently, specialization are positively related to adoption of innovative medical technologies. When organizational size and specialization are controlled for, it is argued that the negative coefficient for age occurs because innovation adoption is most likely in young hospitals—those hospitals that are not yet "established" and whose viability is yet to be insured. Such hospitals are likely to use innovation in the core technology as a strategy for defining a niche. Again controlling for size and specialization, older hospitals are less likely to adopt innovations because in most cases they have achieved a level of security and have already created a niche in the environment.

Table 6 presents the results of the regression of administrative innovation on all three classes of variables. As the table indicates, two variables provide a unique contribution to the explanation of variance in the dependent variable. Specifically, hospitals that are adopters of administrative innovations tend to be large and have hospital administrators who are cosmopolitan. The regression equation accounts for 36 percent of the

TABLE 6
Results for Regression of Administrative Innovation on All Variables

| Variable | Beta | SE |
|---|---|---|
| HA tenure | .04 | .068 |
| CM tenure | .03 | .060 |
| HA cosmopolitanism | .15* | .063 |
| CM cosmopolitanism | -.07 | .061 |
| HA educational substance | .03 | .066 |
| HA educational level | .14 | .071 |
| HA committee participation | .08 | .066 |
| HA involvement in medical activities | .05 | .062 |
| CM involvement in administrative activities | -.03 | .062 |
| Centralization | .08 | .064 |
| Specialization | .14 | .108 |
| Size | .34** | .104 |
| Functional differentiation | .15 | .106 |
| External integration | .09 | .082 |
| Competition | .05 | .070 |
| Size of city | -.10 | .075 |
| Age | -.13 | .072 |
| $R^2 = .36$ | | |

*$p < .05$
**$p < .01$

variance in adoption behavior and fails to attribute significance to the hospital administrator's educational level or the presence of competition in the area, both of which were significant when administrative innovation was regressed on each category of independent variables separately. Although the evidence is not as overwhelming in this case as it is in the case of technological innovation, the import of organizational variables cannot be ignored; hospital size clearly is the best predictor of adoption of administrative innovation as it was of technological innovation. It should be noted that a sign reversal for the age variable occurred here as well, but the partial regression coefficient was not significant.

## CONCLUSIONS AND IMPLICATIONS

This paper has reported the results of a comparative analysis of the effects of variables from three different levels of analysis on organizational adoption of two different types of innovation. The analyses were designed to confront three issues in previous work on organizational innovation: the focus of most studies on a single innovation or class of innovations; the frequent use of sample sizes too small to permit application of multivariate analytic techniques; and the scarcity of studies examining the combined effects of individual, organizational, and contextual factors on adoption of innovation.

Three primary conclusions can be drawn on the basis of the analyses presented here. First, the variables used in the study were much better predictors of the adoption of technological innovations than of administrative innovations. When combined, they explained 65 percent of the variance in technological innovation as compared with 36 percent of the variance in administrative innovation.

Second, adoption of the two different types of innovations was not influenced by identical sets of variables. Analysis of the separate effects of variables from the three levels of analysis revealed that only one variable from each level was a significant predictor of adoption for both types of innovation. The educational level of the hospital administrator, the size of the organization, and the presence of competition in the local environment were significant predictors of both technological and administrative innovation in the separate analyses. In the analysis of their combined effects, only size was a significant predictor of both types.

Third, organizational level variables—and size in particular—are indisputably better predictors of both types of innovation than either individual or contextual level variables. In the case of technological innovations, the only nonorganizational level variable that emerged as a significant predictor was the age of the hospital, which had been conceptualized as a contextual variable. And in the case of administrative innovation, the only significant nonorganizational level predictor was the cosmopolitanism of the hospital administrator, although the educational level of the hospital administrator and the age of the hospital approached significance. Although it was anticipated that organizational level variables would play a role in predicting innovation, their empirical dominance was not expected.

Certain constraints on the generalizability of the findings should be noted. The study was carried out in hospitals. It remains to be seen whether similar variables would be good predictors of adoption behavior in other kinds of organizational settings. Furthermore, although the choice of variables was guided by prior theory and research, the strategy of using an existing data base limited the range of variables available for analysis. Hence, other variables not included among those used here might prove to be good predictors. Finally, the two types of innovations examined were both "technological" in the narrow sense of the term, even though their organizational significance was quite different, and it should not be assumed that similar results would be found with other types of innovation.

What are the implications of the results for theory and research on organizational innovation? The independent variables *were not* equally effective in predicting adoption of the two types of innovation, and *different* variables accounted for their adoption. This means that, at least in the short run, theory construction efforts should focus on middle range theories that help explain adoption of particular types of innovation. More inclusive theories might ultimately emerge, and such theories are desirable. But at present, although it may be true, for example, that initiation and implementation are two distinct "stages" in the process of innovation adoption—as Zaltman et al. (1973) and Duncan (1977) have asserted—it is not obvious that different types of innovation have the same organizational salience or engage in identical organizational processes in the course of their adoption. The decision to adopt an innovation will be affected not only by the performance characteristics of the innovation but by the way in which various key actors in the organizational system assess its likely impact on them and their prerogatives. There thus is no reason to expect that a given set of variables will be related to the adoption of different types of innovation in the same way.

Three additional implications should be noted. First, the research dealt only with situations in which it could be determined that an adoption decision actually had been made. The procedure was then to assign a score to each hospital based on the total number of adoptions that had taken place for each type of innovation. This procedure places this research in the same domain as most other research on organizational innovation in that adoption takes on implicitly positive connotations. Innovation is good and more innovation is better. The effort to distinguish between the desirability of the technological innovations revealed that adoption does not appear to be influenced by either the current or initial importance of the sample of innovations as determined by the panel of experts used. Can it be that the quality of an innovation—as difficult as "quality" may be to determine—does not significantly influence adoption decisions? One would think that this would be a particularly important criterion with regard to production process innovations in hospitals where the raw material on which work is performed is patients with a variety of illnesses and intensity of suffering. Yet the data suggest at the very least that the answer is not obvious. Research focused on the politics of decision making in which the perspective of the researcher was critical, as opposed to implicitly supportive, of innovative adoption would help shed light on this important question.

Second, many questions remain to be answered about post adoption behavior in organizations. In particular, how and under what conditions does exnovation, that process whereby an organization decides to divest itself of an innovation that it had previously adopted, occur? This question is important because innovations in organizations have variable life expectancies. They ebb and flow, and the adoption of one innovation may be made possible by another's exnovation. Research that focuses exclusively on adoption simply does not consider what happens subsequently, and adoption certainly is not the only critical event in the life of an organizational innovation (Brewer, 1980; Kimberly, 1981).

Finally, the explanatory dominance of the organizational level variables in this study requires some comment. It is possible, of course, that had other individual and contextual level variables been included in the analyses, this dominance would have been diminished, particularly in the case of administrative innovation that left a great deal of variance unexplained. And, as has been argued elsewhere (Kervasdoué & Kimberly, 1978), there may be important cross-national differences at the institutional level that will influence the extent to which organizational effects predominate.

On the other hand, adoption of the two types of innovation does seem to be organizationally anchored and subject to organizational level explanations, although the explanations are different. In the case of technological innovation, it does appear reasonable to expect that adoption will be higher in hospitals that are relatively large, specialized, and functionally differentiated. If specialization and functional differentiation are seen as organizational responses to problems encountered in treating the increasingly heterogeneous acutely ill patient population, which is likely to be the domain of the kinds of hospitals included in this sample, then adoption of innovations in the core technology can be seen as one vehicle for both solving increasingly complex and nonroutine problems in the technical core and enhancing the attractiveness of the hospital to physicians as a place to treat patients. In the case of administrative innovation, the explanation is more straightforward but no less organizationally anchored. In large, specialized, and functionally differentiated hospitals, generic problems of coordination and control are exacerbated. Adoption of electronic data processing capabilities is an effort by hospital management to maintain control in the face of operations of relatively large scale.

In brief, decisions to adopt technological innovations are driven by the needs of those in the technical core, needs that are a function of decisons previously taken with regard to domain, structure, and scale. Decisions to adopt administrative innovations are driven by needs of managers to insure coordination and control, needs that are attenuated in large facilities. Particularly given the complexity of the core technology and the demands of coordination and control inherent in the kinds of organizations considered here, the finding that organizational variables are more potent predictors of innovation adoption than are the characteristics of leaders is consistent with the contention of Perrow (1970) and the findings of Lieberson and O'Connor (1972) and Salancik and Pfeffer (1977) that leaders have limited impacts on organizational outcomes.

It is not argued that organizational level variables should necessarily be expected to be as efficacious in a predictive sense with all types of innovation. It may be that adoption of the two types of innovation studied here, because they are both technologically oriented, is more likely to be organizationally determined than, for example, nonhardware programmatic innovations. However, when taken together, the results of this study are compelling and add some data to the debate between micro and macro organizational theorists that cannot be ignored.

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# *Substitutes for Leadership: Test of a Construct*[1]

**JON P. HOWELL**
**PETER W. DORFMAN**
**New Mexico State University**

*The study reported here examined the impact of leadership substitutes on subordinate job satisfaction and organizational commitment. Leadership substitutes, as suggested by Kerr (1977), replace or "act in the place of" a specific leader behavior. Multiple regression was used to test the validity and strength of potential substitutes. Results indicated mixed support for the substitutes construct.*

Several writers have recently pointed out an apparent assumption in all current theories of leadership—that some form of hierarchical leadership is always important in influencing subordinate attitudes and/or performance (Kerr, 1977; Kerr & Jermier, 1978). Although theories vary somewhat in their prescriptions regarding the appropriateness of different leader behaviors in a given situation, all assume that the effective leader provides some type of guidance and/or positive feelings for subordinates as they carry out their job tasks. For example, the highly researched path-goal theory of leadership predicts that a leader's behavior will be motivating and/or satisfying to subordinates when the behavior clarifies paths to goal attainment, clarifies contingent rewards, and increases subordinates' expected and actual attainment of goals and rewards (House & Mitchell, 1974). Another popular theoretical approach, the transactional or interaction approach makes the explicit assumption that "the *quality* of leadership does matter" (Hollander, 1978, p. 1). Continual leader-subordinate interaction is emphasized with this approach. The leader directs subordinates toward mutually desired results; subordinates reciprocate by providing increased status, esteem, and support for the leader. Notwithstanding the inherent logic and empirical support for these leadership paradigms, leadership variables continue to account for only a small portion of the criterion variance in most empirical studies.

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Kerr (1977) has suggested the concept of *substitutes for leadership* to help explain the occasional successes and frequent failures of leadership predictions. Leadership substitutes replace or "act in place of" a specific leader behavior. They also may act as moderator or suppressor variables by influencing the relationship between leader behavior and subordinate attitudes and/or performance. However, by acting in place of a specific leader behavior, substitutes can play a much more important role than simply as a moderator variable. Kerr suggests that substitutes render hierarchical leadership both unnecessary and impossible in terms of the potential impact of leadership on important subordinate outcomes.

Kerr and Slocum describe professional orientation as an example of a leadership substitute. "Professionals' expertise...reduces their need for task-related information, and both expertise and claims for autonomy reduce their receptivity toward efforts by leaders to provide such information. Preference for collegial maintenance of standards can also impair leaders' efforts to control [professional] subordinates' performance" (1981, p. 35). Jermier and Berkes (1979) have described other possible examples of leadership substitutes in a police organization. The reliance on closely-knit, cohesive work groups (two-man patrol units) during the evening shift was seen as preventing and replacing the impact of hierarchical leadership on subordinate morale. Jermier and Berkes also suggest that the existence of intrinsically satisfying work tasks may substitute for a leader's supportive behavior. In each of these cases a characteristic of the organization, the subordinate, or the subordinates' job task may substitute for the hierarchical leader by impacting on important subordinate outcomes and also preventing the hierarchical leaders' behavior from having an impact.

Several variables that characterize professionals working in organizations have been suggested as potential substitutes for hierarchical leadership. These include: the degree of professionalism of organizational participants; their ability, experience, training, and knowledge; task provided feedback concerning accomplishment; the degree of intrinsic satisfaction derived from task accomplishment; and the presence of a closely knit cohesive work group (Kerr, 1977).

In preliminary validation studies, Kerr and Jermier (1978) obtained findings indicating that two additional variables also may be important leadership substitutes. These are the degree of organizational formalization that is present (e.g., clear written job goals, objectives, and responsibilities; written performance appraisals and work schedules) and the existence of unambiguous, routine, and methodologically invariant tasks. Other findings by Miles and Petty (1977) have been interpreted as support for organizational formalization as a possible substitute. Clearly, these organizational and task characteristics may have the potential to provide the necessary task guidance and direction for subordinates' behavior that is often provided by a hierarchical superior.

Although there is a clear rationale for the concept of substitutes for leadership, research in this area has been minimal and the empirical data are not strong. Kerr and Jermier (1978) found only a few possible substitutes when using a shotgun regression approach. Although intriguing, their findings provided only weak support for the concept. Conclusions by Miles and Petty (1977) regarding organizational formalization as a substitute are questionable on several grounds. They used a surrogate measure of organizational formalization (organization size); the validity of their leadership instrument (the Supervisory Behavior Description Questionnaire) has been questioned; and their exclusive use of simple moderated bivariate correlations for data analysis does not provide direct evidence that the proposed substitute "acts in place of" hierarchical leadership.

The purpose of this study is to: (a) further elucidate the substitutes concept, (b) empirically test hypotheses that match specific substitutes with a given leader behavior, and (c) provide a logical rationale to determine the relative strength of a substitute vis-à-vis a specific leader behavior.

The theoretical and empirical developments discussed above suggest the following hypotheses as meaningful for testing the viability of the leadership substitutes concept. The specific types of leader behavior mentioned in each hypothesis are described in detail in the methods section.

> *Hypothesis 1: The following variables may replace or substitute for a leader's supportive behaviors in predicting important subordinate outcomes: the presence of intrinsically satisfying work tasks, of task provided feedback concerning performance, of a highly professional orientation among subordinates, and/or of closely knit cohesive work groups.*
>
> *Hypothesis 2: The following variables may replace or substitute for a leader's instrumental behaviors in predicting important subordinate outcomes:*
>
>> *Subhypothesis 2a: Substitutes for the instrumental leader behaviors of work assignment and specification of procedures may include the presence of routine, methodologically invariant work tasks and/or a high degree of organizational formalization.*
>>
>> *Subhypothesis 2b: Substitutes for the instrumental leader behavior of role clarification may include the presence of a highly professional orientation among subordinates; a high degree of ability, experience, training, and knowledge among subordinates; closely knit cohesive work groups; a high degree of organizational formalization; and/or routine, methodologically invariant work tasks.*

## METHOD

### Sample

Questionnaires were administered during normal working hours to personnel in all segments of a medium sized (183-bed) community hospital in the Southwest. Employees were given the option either to remain anonymous or to sign their names to the questionnaire. After being assured of strict confidentiality, 75 percent of the participating employees chose to sign their names. The 220 participating employees worked within the following job categories: administrative ($n = 34$), including top level managers, departmental and unit managers, assistant managers, and supervisors; professional ($n = 48$), including RNs, pharmacists, social workers, accountants, etc.; technical and paraprofessional ($n = 46$), including LPNs, lab and X-ray technicians, orderlies, nursing assistants, etc.; and other support positions ($n = 92$), including clerical, service-maintenance, protective service, and skilled craft workers. Of the 461 full time employees at the hospital, approximately 44 percent participated in the study. The sample was diverse in terms of demographic variables and skill levels. The mean age of respondents was 34.7 years; 165 were female and 55 were male. Data were collected from all three hospital shifts and included a representative sample across all hospital divisions.

The hospital was selected as a research site because it offered an unusually rich variety of skills, backgrounds, and professions in a single organization. This organizational type was also mentioned by Kerr (1977) as likely to have several potentially important substitutes for leadership.

### Measures

Instrumental and supportive leader behaviors were measured using scales developed specifically for hypothesis testing regarding path-goal theory (Schriesheim, 1978). Potential substitutes for leadership were measured using scales recently developed by Kerr and Jermier (1978). Portions of the leadership substitutes scales were revised in order to increase their reliability. Subordinates' perceived role ambiguity and role conflict also were measured, using scales developed by House, Rizzo, and Lirtzman (1970). Role ambiguity has been shown to be an important moderator in previous research dealing with various aspects of leadership behavior (Szilagyi & Sims, 1974) and widely used criteria measures (Schuler, Aldag, & Brief, 1977). Role conflict has been identified as an important situational variable in hospital organization research (Schuler et al., 1977; Georgopoulos, 1975). The two subordinate criterion measures utilized in this study were organizational commitment, using the Organizational Commitment Questionnaire developed by Porter and Smith (1970), and general job satisfaction using the Minnesota Satisfaction Questionnaire—short form (Weiss, Dawis, England, & Lofquist, 1967). These organizational and individual dimensions are briefly described below:

*Leadership Behavior*

Instrumental leader behavior

| | |
|---|---|
| Work assignment | Assignment of subordinates to specific tasks. |
| Specification of procedures | Enforcing rules, procedures and work methods. |

| | |
|---|---|
| Role clarification | Clarifying management expectations of subordinates in their work. |
| Supportive leader behavior | Warmth, trust and concern shown by leader for subordinates. |
| *Potential Substitutes* | |
| Of the subordinate: | |
| Professional orientation | |
| Ability, experience, training, and knowledge | |
| Of the task: | |
| Provides its own feedback concerning accomplishment | |
| Intrinsically satisfying | |
| Routine and methodologically invariant | |
| Of the organization: | |
| Closely knit, cohesive work groups | |
| Organizational formalization—explicit plans, goals, and areas of responsibility | |
| *Moderators* | |
| Role ambiguity | Absence of clarity of behavioral requirements that guide behavior. |
| Role conflict | Perceived conflict between required role behaviors and personal values or personal capabilities. |
| *Criteria* | |
| Organizational commitment | Individual's identification with organizational values and goals, desire to stay, and willingness to work hard. |
| General job satisfaction | Individual's overall satisfaction with job and organization. |

## General Design and Analysis Strategy

The analysis strategy used here refined and extended the approach used in previous substitutes research. Previously, researchers included all the above described leader behaviors and numerous potential substitutes in a single multiple regression model (Kerr & Jermier, 1978). Although these researchers obtained several statistically significant findings, their results did not indicate which substitutes replaced a given leader behavior or how much of a substitute was required to alleviate the need for leadership. In this study, the attempt has been made to develop a logical strategy to assess the *degree of substitutability* of a particular individual, task, or organizational characteristic for a *specific leader behavior.*

The analysis procedure was stepwise in nature, involving a series of increasingly rigorous tests for a variable to qualify as a substitute for leadership. The series of tests resulted in classifying a variable as a nonsubstitute, weak substitute, strong substitute, or a very strong substitute. A substitute's form depended on its relative ability to replace a particular leadership behavior (using the multiple regression model) in explaining the variance of a criterion measure.

The rationale and tests are outlined below:

1. For a variable to qualify as a potential substitute for leadership, there had to be a logical explanation of how the variable could possibly take the place of a specific leader behavior and therefore make the leader behavior unnecessary.

2. To provide an adequate test for a potential substitute, situations were investigated in which there was reason to believe that the leader behavior in question was potentially important. That is, the leader behavior had to have potential predictive power over the criterion. Two analysis strategies were used to obtain evidence on the predictive power of a leader behavior. First, if the bivariate correlation between the leader behavior and the criterion was significant, it was considered to have predictive power. This is a stringent criterion in that it could result in omitting from the study potentially important cases of leadership substitutes (such as when a leader behavior was prevented from having an impact by the presence of a substitute). Therefore, if the leader behavior did not correlate significantly with the criterion, a second analysis was conducted to assess further the leader behavior's predictive power. In the second analysis, a subgroup moderator analysis was conducted. The sample was dichotomized based on a median separation on the substitute(s) being studied. Both bivariate correlation and multiple regression analysis (see equation 1 below) were conducted on the resulting subgroups. If the leader behavior produced either a correlation coefficient or a regression coefficient which was significant in the "low substitute" subgroup, then it was considered to have potential predictive power.

3. If the above two conditions were met, then a test of the potential substitute was feasible. The next step was to determine if the potential substitute was significantly correlated with the criterion. If this bivariate correlation was not significant, then the variable was not a substitute (and was therefore classified as a nonsubstitute) because it could not replace the leader behavior that did have potential explanatory power. If this bivariate correlation was significant, then the following multiple linear regression (MLR) strategy was used for the analysis.

4. The general form of the MLR equation was:

$$\text{CRITERION} = b_{\text{PS}}X_{\text{PS}} + b_{\text{LB}}X_{\text{LB}} + b_{\text{PSLB}}X_{\text{PS}}X_{\text{LB}} + K \tag{1}$$

where: $b_{\text{PS}}$ = regression coefficient of potential substitute
$X_{\text{PS}}$ = potential substitute
$b_{\text{LB}}$ = regression coefficient for leader behavior
$X_{\text{LB}}$ = leader behavior
$b_{\text{PSLB}}$ = regression coefficient for the interaction term
$X_{\text{PS}}X_{\text{LB}}$ = interaction of the two predictors
$K$ = regression constant

The potential substitute was entered first in a modified stepwise regression procedure and was "forced" to remain in the predictor set. The leader behavior, on the other hand, was allowed to drop out if it did not add significantly to the explained criterion variance.

The question in statistical terms is simply, does the addition of the leadership variable (when entered as the second predictor) add to the predictability of the criterion? Using a statistical test ($F$) to evaluate the relative efficacy of different variables in the regression is a powerful method of analysis (Kerlinger & Pedhazur, 1973). However, the relative efficacy of a variable is affected by the order of the variables in the equation. This is precisely the point in the present analysis. The leadership variable is always entered after the potential substitute to determine if the predictability of the leadership variable can be obviated by the substitute. Thus, variables are placed in the regression equation according to a logical and theoretical framework.

The following criteria were utilized during this phase of the analysis:

(4.1) If $b_{\mathrm{PS}}$ was significant, then $X_{\mathrm{PS}}$ was a substitute of some form—proceed to 4.2.

If $b_{\mathrm{PS}}$ was not significant, then $X_{\mathrm{PS}}$ was a nonsubstitute. That is, although the bivariate correlation was significant (Step 3), the regression coefficient was not significant when the leader behavior ($X_{\mathrm{LB}}$) and the interaction term ($X_{\mathrm{PS}}X_{\mathrm{LB}}$) were added to the predictor set. Step 4 of the analysis was terminated.

(4.2) If $b_{\mathrm{LB}}$ was significant, then $X_{\mathrm{PS}}$ was a weak substitute. That is, although $X_{\mathrm{PS}}$ was a significant predictor and may be considered at least a partial replacement for the $X_{\mathrm{LB}}$, it did not totally eliminate the ability of $X_{\mathrm{LB}}$ to account for criterion variance. Step 4 of the analysis was terminated.

If $b_{\mathrm{LB}}$ was not significant, then $X_{\mathrm{PS}}$ was a strong or very strong substitute—proceed to 4.3.

(4.3) If $b_{\mathrm{PSLB}}$ was significant, then $X_{\mathrm{PS}}$ was a strong substitute. That is, $X_{\mathrm{LB}}$ no longer had predictive power of its own, but $X_{\mathrm{LB}}$ must be considered in conjunction with $X_{\mathrm{PS}}$ to predict accurately the criterion. Step 4 of the analysis was terminated.

If $b_{\mathrm{PSLB}}$ was not significant, then $X_{\mathrm{PS}}$ was a very strong substitute. That is, $X_{\mathrm{PS}}$ contained all the predictive power of this model by accounting for all the criterion variance; $X_{\mathrm{LB}}$ no longer had an impact on the criterion. Step 4 of the analysis was terminated.

In addition to the above series of tests, in which each model focused on the substitutability of a single variable for a specific leader behavior, further MLR models were tested that reflect the possibility that more than one individual, task, or organizational characteristic may combine to replace the explanatory power of a given leader behavior. The general form for these equations was:

$$\mathrm{CRITERION} = b_{\mathrm{PS1}}X_{\mathrm{PS1}} + b_{\mathrm{PS2}}X_{\mathrm{PS2}} + b_{\mathrm{LB}}X_{\mathrm{LB}} + K \qquad (2)$$

where: $b_{PS1}$ = regression coefficient for potential substitute number 1
$X_{PS1}$ = potential substitute number 1
$b_{PS2}$ = regression coefficient for potential substitute number 2
$X_{PS2}$ = potential substitute number 2
$b_{LB}$ = regression coefficient for leader behavior
$X_{LB}$ = leader behavior
$K$ = regression constant

An analysis strategy similar to the single substitute strategy discussed above also was appropriate for multiple substitutes. Regression coefficients again indicated if the data supported the hypotheses when two substitutes were included. With equation 2, if $b_{LB}$ was not significant and $b_{PS1}$ and/or $b_{PS2}$ were significant, it was concluded that these two variables combined to form at least a strong substitute for the leader behavior. No interaction term was included in these models due partially to the difficulty of interpretation and partially to the unlikelihood of the interaction term accounting for a sizable amount of variance.

## RESULTS

Table 1 presents means and standard deviations for all the variables included in this study. This sample of hospital employees showed slight differences on leadership behaviors when compared with a sample of police officers reported by Jermier and Berkes (1979). Hospital employees scored significantly lower on ability, experience, training, and knowledge, but were not significantly different on professional orientation. Hospital employees scored significantly higher than police officers on routinization, task feedback, intrinsic task satisfaction, organizational formalization, and existence of cohesive work groups. The present sample was low on organizational commitment when compared with other hospital employees, business managers, and bank employees (Mowday, Steers, & Porter, 1978) and low on general job satisfaction compared with business managers, nurses, and the general employed population (Weiss et al., 1967). (Conversations with employees in the sampled organization indicated that although they generally enjoyed their type of work, their attitudes toward their employing organization often were unfavorable. At the time of this study, the hospital had been administered for almost two years by an out-of-state professional management firm. Policies and procedures initiated by the "________ group," a term sometimes used to describe the top administrators appointed by the management firm, were resented by some staff members. These employees seemed to equate the "organization" with this outside management group and may have reflected their resentment in low levels of organizational commitment and general satisfaction.) Although there is considerable literature on the importance of role problems among hospital employees (Georgopoulos, 1975), no data were found that included comparable statistics for role ambiguity and role conflict.

### TABLE 1
### Hospital Employees
### Means and Standard Deviations
### ($N = 220$)

| | *Mean* | *Standard Deviation* |
|---|---|---|
| Supportive leader behavior (SUPPORT) | 3.9 | .70 |
| Instrumental leader behaviors | | |
| Work assignment (ILBWA) | 3.2 | .80 |
| Specification of procedures (ILBSPEC) | 2.8 | .69 |
| Role clarification (ILBROLCL) | 3.7 | .75 |
| Ability, experience, training and knowledge (AETK) | 3.8 | .84 |
| Professional orientation (PROF) | 2.6 | .88 |
| Routine methodologically invariant work tasks (ROUTIN) | 3.3 | .88 |
| Task provided feedback concerning performance (TSKFB) | 3.9 | .80 |
| Intrinsically satisfying work tasks (INSAT) | 3.7 | .86 |
| Organizational formalization (ORFORM) | 3.5 | .73 |
| Closely knit cohesive work group (CLOSE) | 3.1 | .80 |
| Role ambiguity (RROLAM) | 1.9 | .80 |
| Role conflict (RROLCN) | 2.0 | .61 |
| Organizational commitment (ORGCOM) | 4.4 | 1.35 |
| General job satisfaction (SGENSAT) | 73.2 | 9.80 |

Each of the potential substitutes has been suggested previously to imply a logical explanation of how the variable (potential substitute) takes the place of a specific leader behavior (Kerr, 1977; Kerr & Jermier, 1978; Jermier & Berkes, 1979). These potential substitutes were thus assumed to pass the first test in the analysis procedure.

Table 2 presents intercorrelations among all the individual variables included in this study. Some leadership behaviors correlated significantly with one another (e.g., the correlation between support and role clarification was .58, slightly smaller than that reported by Jermier and Berkes, 1979). For the potential substitutes, 48 of the 49 intercorrelations were below .30, the other intercorrelation was below .40. Because no more than one leader behavior was included in any MLR model, multicollinearity was not a problem in this study.

Table 2 also presents reliability coefficients for all the variables. Several scales used in this study were modified in order to increase their internal consistency reliability. The weakest items were deleted in these scales, resulting in increased reliabilities in all cases. Because internal consistency measures are a function of both the correlations among scale items and the number of items, the reliability coefficient for the original three item scales that were reduced to two items did not increase dramatically. However, for all two and three item scales, all items intercorrelated at $p \leq .01$.

As shown in Table 2, all four leader behaviors were significantly correlated with organizational commitment. Only two of the leader behaviors correlated significantly with general job satisfaction—leader's support and role clarification behaviors. Further analysis of the two leader

## TABLE 2
## Variable Reliabilities and Intercorrelations*

| | *1* | *2* | *3* | *4* | *5* | *6* | *7* | *8* | *9* | *10* | *11* | *12* | *13* | *14* | *15* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. SUPPORT | (.90)[a] | | | | | | | | | | | | | | |
| 2. ILBWA | .07 | (.72) | | | | | | | | | | | | | |
| 3. ILBSPEC | −.17 | .24 | (.60) | | | | | | | | | | | | |
| 4. ILBROLCL | .58 | .24 | .08 | (.81) | | | | | | | | | | | |
| 5. AETK | .07 | .04 | −.23 | .15 | (.61) | | | | | | | | | | |
| 6. PROF | .04 | .08 | −.10 | −.02 | −.01 | (.51) | | | | | | | | | |
| 7. ROUTIN | .08 | .12 | .14 | .17 | .01 | .02 | (.50) | | | | | | | | |
| 8. TSKFB | .09 | .00 | −.06 | .12 | .21 | .11 | .26 | (.40) | | | | | | | |
| 9. INSAT | .11 | .07 | −.05 | .18 | .24 | .07 | −.04 | .20 | (.46) | | | | | | |
| 10. ORFORM | .23 | .07 | −.01 | .37 | .01 | .00 | .13 | .15 | .04 | (.86) | | | | | |
| 11. CLOSE | −.18 | −.07 | −.05 | −.17 | −.04 | .31 | −.09 | .07 | .14 | −.09 | (.77) | | | | |
| 12. RROLAM | −.19 | −.06 | −.06 | −.38 | −.25 | .15 | −.23 | −.20 | −.24 | −.25 | .17 | (.77) | | | |
| 13. RROLCN | −.24 | .03 | −.20 | −.23 | −.01 | .19 | −.24 | −.10 | −.19 | −.24 | .19 | .45 | (.74) | | |
| 14. ORGCOM | .22 | .17 | .18 | .32 | .04 | −.04 | .18 | .10 | .29 | .25 | −.26 | −.28 | −.36 | (.92) | |
| 15. SGENSAT | .44 | .11 | .01 | .44 | .00 | .04 | .05 | .16 | .37 | .32 | −.18 | −.25 | −.40 | .60 | (.98) |

[a] KR-14 reliability coefficients in parentheses

*$p < .05$ if $r > |.13|$

behaviors that failed to correlate with general job satisfaction (instrumental leader behaviors—work assignment and specification of procedures) provided no evidence that they contained potential predictive power over this outcome variable. According to the second test of the analysis procedure, hypothesis testing regarding leadership substitutes was conducted with this sample for all four leader behaviors vis-à-vis organizational commitment and for leader behaviors-support and role clarification vis-à-vis general job satisfaction.

The third test of the analysis procedure involved testing the significance of the bivariate correlations between potential substitutes and criteria variables. As shown in Table 2, five of the seven substitutes correlated significantly with the criteria—intrinsically satisfying work tasks, organizational formalization, and closely knit cohesive work groups were significantly correlated with both criteria variables; routinized methodologically invariant work tasks correlated significantly with organizational commitment; and direct task feedback concerning accomplishment correlated with job satisfaction. Thus, these five potential substitutes were included in the fourth test of the analysis procedure—the modified stepwise MLR analysis involving a single potential substitute, a single leader behavior, and an interaction term combining these two predictors.

The results of the single substitute MLR analysis are presented in Table 3. For organizational commitment as the criterion, the only case of a very strong substitute for leadership occurred with organizational formalization substituting for instrumental leader behavior—work assignment. Here the substitute replaced the predictive power of the leader behavior. There were numerous cases of weak substitutes for leadership when predicting organizational commitment—intrinsically satisfying work tasks and cohesive work group substituting for supportive leader behavior; routine work tasks substituting for all three instrumental leader behaviors; organizational formalization substituting for instrumental leader behavior—specification of procedures; and cohesive work group substituting for instrumental leader behavior—role clarification. These substitute variables add to the coefficient of multiple correlation when included in the predictor set, but they do not prevent or replace the leader behavior's impact on the criterion. For general job satisfaction as the criterion, intrinsically satisfying work tasks, organizational formalization, and task provided performance feedback qualify as weak substitutes for leadership. Cohesive work group does not qualify as a substitute for leadership with general job satisfaction as the criterion.

Previous findings have shown that perceived role ambiguity and role conflict may be important moderators in leadership research. Consequently, the sample was dichotomized two times—based on a median separation on role ambiguity and role conflict present in the respondent's job. The above MLR models were applied to the dichotomized subgroups with results very similar to those reported here for the aggregated sample. Those differences that did occur in the subgroup analysis were due

## TABLE 3

### Multiple Regression Results: Organizational Commitment and General Job Satisfaction Regressed upon Leader Behavior and Individual Potential Leadership Substitutes[a]

### ($N = 220$)

| | Predictors | | | | |
|---|---|---|---|---|---|
| *Criteria* | *Potential Substitute* | *Leader Behavior* | *Interaction Term* | *R* | *Form of Substitute* |
| ORGCOM | INSAT<br>($\beta = .27$) | SUPPORT<br>($\beta = .20$) | INSAT × SUPPORT<br>($\beta$ = NS) | .35 | Weak |
| | CLOSE[b]<br>($\beta = -.23$) | SUPPORT<br>($\beta = .21$) | CLOSE × SUPPORT<br>$\beta$ = NS) | .34 | Weak |
| | ROUTIN<br>($\beta = .16$) | ILBWA<br>($\beta = .14$) | ROUTIN × ILBWA<br>($\beta$ = NS) | .23 | Weak |
| | ORFORM<br>($\beta = .25$) | ILBWA<br>($\beta$ = NS) | ORFORM × ILBWA<br>($\beta$ = NS) | .28 | Very strong |
| | ROUTIN<br>($\beta = .15$) | ILBSPEC<br>($\beta = .17$) | ROUTIN × ILBSPEC<br>($\beta$ = NS) | .24 | Weak |
| | ORFORM<br>($\beta = .26$) | ILBSPEC<br>($\beta = .15$) | ORFORM × ILBSPEC<br>($\beta$ = NS) | .30 | Weak |
| | ROUTIN<br>($\beta = .13$) | ILBROLCL<br>($\beta = .27$) | ROUTIN × ILBROLCL<br>($\beta$ = NS) | .35 | Weak |
| | ORFORM<br>($\beta$ = NS) | ILBROLCL<br>($\beta = .27$) | ORFORM × ILBROLCL<br>($\beta$ = NS) | .33 | Nonsubstitute[c] |
| | CLOSE<br>($\beta = -.19$) | ILBROLCL<br>($\beta = .29$) | CLOSE × ILBROLCL<br>($\beta$ = NS) | .38 | Weak |
| SGENSAT | INSAT<br>($\beta = .31$) | SUPPORT<br>($\beta = .43$) | INSAT × SUPPORT<br>($\beta$ = NS) | .56 | Weak |
| | TSKFB<br>($\beta = .13$) | SUPPORT<br>($\beta = .46$) | SUPPORT × TSKFB<br>($\beta$ = NS) | .48 | Weak |
| | CLOSE<br>($\beta$ = NS) | SUPPORT<br>($\beta = .47$) | CLOSE × SUPPORT<br>($\beta$ = NS) | .49 | Nonsubstitute |
| | ORFORM<br>($\beta = .16$) | ILBROLCL<br>($\beta = .42$) | ORFORM × ILBROLCL<br>($\beta$ = NS) | .49 | Weak |
| | CLOSE<br>($\beta$ = NS) | ILBROLCL<br>($\beta = .42$) | CLOSE × ILBROLCL<br>($\beta$ = NS) | .44 | Nonsubstitute |

[a] All beta ($\beta$) values shown are significant at the .05 level or beyond.

[b] CLOSE (closely knit cohesive work group) has a negative beta value, indicating that the absence of this organizational characteristic is associated with increasing levels of organizational commitment. This result is further discussed in the concluding section.

[c] The beta value for ORFORM was marginally significant ($\beta = .13$, $.05 < p < .10$).

primarily to the smaller sample size rather than large changes in beta values. The one notable exception occurred with role ambiguity as a moderator for instrumental leader behavior-role clarification when predicting organizational commitment. Under low role ambiguity, this instrumental leader behavior yielded a nonsignificant beta value, and both organizational formalization and cohesive work group (whose beta values were significant) became very strong substitutes.

Table 4 presents the results of the two-substitute stepwise MLR analysis. Only one of the two-substitute sets acted as a strong substitute for leadership. The combination of organizational formalization and routine work tasks replaced the predictive power of instrumental leader behavior—work assignment when predicting organizational commitment. For all the two-substitute models tested, none predicted better than did the comparable single-substitute model.

### TABLE 4
### Multiple Regression Results: Organizational Commitment and General Job Satisfaction Regressed upon Leader Behavior and Sets of Potential Leadership Substitutes[a]

| | *Predictors* | | | | |
|---|---|---|---|---|---|
| *Criteria* | *Potential Substitute* | *Potential Substitute* | *Leader Behavior* | *$R$* | *Form of Substitute Set* |
| ORGCOM | INSAT<br>$(\beta = .26)$ | TSKFB<br>$(\beta = \text{NS})$ | SUPPORT<br>$(\beta = .20)$ | $R = .36$ | Weak |
| | ORFORM<br>$(\beta = .22)$ | ROUTIN<br>$(\beta = .14)$ | ILBWA<br>$(\beta = \text{NS})$ | $R = .31$ | Strong |
| | ORFORM<br>$(\beta = .22)$ | ROUTIN<br>$(\beta = \text{NS})$ | ILBSPEC<br>$(\beta = .15)$ | $R = .32$ | Weak |
| | ORFORM<br>$(\beta = \text{NS})$ | ROUTIN<br>$(\beta = \text{NS})$ | ILBROLCL<br>$(\beta = .25)$ | $R = .36$ | Nonsubstitute |
| SGENSAT | INSAT<br>$(\beta = .30)$ | TSKFB<br>$(\beta = \text{NS})$ | SUPPORT<br>$(\beta = .42)$ | $R = .56$ | Weak |
| | ORFORM<br>$(\beta = .17)$ | ROUTIN<br>$(\beta = \text{NS})$ | ILBROLCL<br>$(\beta = .39)$ | $R = .47$ | Weak |

[a] All beta ($\beta$) values shown are significant at the .05 level or beyond.

## DISCUSSION

The findings from this study provide mixed support for the leadership substitute construct as stated in the hypotheses and described by Kerr (1977) and Kerr and Jermier (1978). Several potential substitutes were found to be important predictors of subordinates' job satisfaction and organizational commitment. However, only one of the single substitutes (organizational formalization) rendered leadership impossible and/or unnecessary. It is felt that the findings from the single-substitute MLR analysis regarding intrinsic task satisfaction, routine methodologically invariant work tasks, and task provided performance feedback warrant classification of these variables as weak substitutes for leadership. These variables do explain a significant amount of the criterion variance and in the absence of any leadership may be viewed as substituting for the potentially important explanatory power of supportive or instrumental leader behaviors.

The negative regression coefficient obtained for cohesive work groups as a potential substitute when predicting organizational commitment may be intuitively puzzling. In the sample, the negative coefficient is understandable in light of the relatively low level of organizational commitment among most of the hospital personnel. From conversations with various members of this organization, it became apparent that a major commitment problem existed in the hospital, and this was supported by the data. It appeared that individuals first looked to their work group for many work related rewards as well as guidance on the job. When these were forthcoming from a cohesive work group, they responded with little commitment to the overall organization. When these important job inputs were not provided by a cohesive work group, they looked to their supervisor to provide them and responded with more commitment to the organization.

The regression models with two potential substitutes yielded only slightly different results from the single substitute models. Kerr and Jermier concluded from their study of police officers: "When powerful leader substitutes such as intrinsically satisfying work and task-provided performance feedback exist, the leader's supportive behaviors fail to contribute significantly in predicting organizational commitment" (1978, p. 393). The findings reported here do not support that conclusion. However, there was support for a two substitute model in one instance. The instrumental leader behavior of work assignment became nonsignificant when organizational formalization and routine work tasks were both included in the predictor set. As Kerr and Jermier noted, this type of guidance information "can readily be transmitted by central dispatching and standard operating procedures" (1978, p. 394).

Kerr (1977) noted that the presence of leadership substitutes may be critical to the effective functioning of individuals and organizations. If important substitutes do exist, then leadership training and organizational development programs designed to improve leaders' effectiveness may yield only ineffectual changes in behavior and eventual frustration for those involved. Findings of the research reported here, however, indicate that hierarchical leadership is still important in this sample, even in the presence of potential substitutes for leadership. Path goal theorists, the interactionists, and others engaged in leadership theory building seem well founded at this point in assuming that leadership can make a difference in explaining important subordinate outcomes.

Kerr and Slocum have recently observed that "formal leadership functions are a primary source of control over people's performance in mechanistic organizations, whereas substitutes for formal leadership operate most strongly when an organization is organic" (1981, p. 46). The bureaucratic (mechanistic) nature of hospital organizations has been noted (Georgopoulos, 1975). This factor may have increased the relative importance of the leadership variables and decreased the importance of potential substitutes in this sample. Many of the substitutes may be most pertinent to professionals in organizations (Kerr, 1977). A larger sample of professional employees to be compared with nonprofessionals might elucidate the conditions under which certain substitutes are most important.

Although the reliability coefficients for the leadership substitutes scales were increased in this study by deleting certain items, there is still room for improvement. It would be useful, in future research, to develop additional items for each of these scales. An important caveat for interpreting the results of this study is the problem of common method variance. Future studies that include other means of assessing the substitutes construct also would be a methodological step forward.

There are several potentially important elaborations of the substitutes construct that were not directly dealt with in this investigation. Kerr and Jermier have distinguished between leadership neutralizers ("characteristics which make it effectively *impossible* for relationship and/or task-oriented leadership to make a difference," 1978, p. 396) and leadership substitutes ("characteristics which render relationship and/or task-oriented leadership not only impossible but also *unnecessary*," 1978, p. 396). The logical distinction between neutralizers and substitutes might fruitfully be studied using laboratory techniques to create an "influence vacuum" resulting from the existence of certain powerful neutralizers (Kerr & Jermier, 1978). It also seems possible, in light of the current contingency approaches to leadership and the findings reported here, that both a supervisor's leadership behavior and one or more of the potential substitute variables may at times coexist—filling in for one another as the situation dictates. In these situations, some of these individual, task, or organizational characteristics might best be termed supplements to leadership.

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# Effects of Flexitime on Employee Attendance and Performance: A Field Experiment[1]

**JAY S. KIM**
**ANTHONY F. CAMPAGNA**
**The Ohio State University**

*The effects of a flexitime program in a county welfare agency are assessed. The analysis of covariance on the employees' attendance and performance revealed that (1) the flexitime program appears to permit employees to reduce their use of unpaid absences and (2) performance efficiency tends to be higher among employees under the flexitime program.*

Flexitime as an organization development intervention has been increasingly popular in American industry. According to one report, approximately 13 percent of the employing organizations in the private sector have adopted a form of flexitime program since it was introduced in the early 1970s. This represents about three million American workers (Nollen & Martin, 1978). The purpose of this study is to investigate the effects of flexitime on employee attendance and performance in a field setting.

Although there are a number of variations in its form, the basic model of flexitime usually consists of five interrelated components: (1) a band width, or the total number of hours in a given workday, (2) a core time, or designated period of time during which all employees are required to be working, (3) a flexible band of hours both before and after the core time that allows employees to vary their starting and quitting times, (4) banking, which allows carry-over of surplus or deficient hours worked, and (5) variability of schedule—the employees' freedom to vary working hours from one period to another without prior approval from their supervisor (Golembiewski & Proehl, 1978). The degree of flexibility and amount of discretion permitted employees depend on the variations in the above five components in the program.

In spite of its popularity in application and numerous success stories, very little is known about the effectiveness of flexitime programs. Most

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studies of them are anecdotal, testimonial, and post hoc in nature; few are based on rigorous empirical investigation. Following an extensive review of literature on flexitime, Golembiewski and Proehl (1978) have reported that of the 16 empirical studies examined, only one included any statistical treatment of the data reported. Thus, the results typically attributed to the flexitime program could be artifacts that would cast serious doubt on the internal validity of the findings. Other methodological and measurement weaknesses commonly shared by the flexitime studies include: (1) the absence of a control group, (2) lack of pre-intervention measures, and (3) the use of "soft" data as criteria.

Notwithstanding these weaknesses, a number of investigators have argued that flexitime has a positive impact on employee attitudes among supervisory employees (Partridge, 1973) and nonsupervisory employees in a large insurance company (Evans, 1973), among employees in a pharmaceutical firm (Golembiewski & Hilles, 1977), and in a computer firm (Hopp & Sommerstad, 1977). In addition, flexitime has been reported to help reduce absenteeism and sick leave (Golembiewski & Hilles, 1977; Mueller & Cole, 1977) and to help increase productivity (Martin, 1975; Nollen & Martin, 1978). In general, the proponents of this program have argued that permitting employees to exercise flexibility in their arriving and quitting time will reduce absenteeism, tardiness, overtime, etc., because these would be accounted for under allowed discretionary time. Further, it has been argued that under the flexitime program the employees would be able to adjust their work activities to their individually more productive hours, resulting in a more efficient utilization of labor input in a work setting (Nollen, 1979). This increase in performance efficiency would further allow the employees to make positive alterations in their attending and their producing behavior.

Although this proposition has not been explicitly tested, three studies with acceptable methodology and measurements have dealt with the impact of flexitime on employees' attendance and performance. Investigating approximately 60 employees in research and development units under a flexitime program, Golembiewski, Hilles, and Kagno (1974) reported findings that suggest that flexitime reduces overtime and absenteeism. They found that the total number of paid absences in the experimental group during a 375-day period was reduced by 35 percent from the immediately preceding year, while absenteeism increased 15 percent in the control group. On the other hand, the expected decrease in short term absences (a single day or less) did not occur in the experimental group. In fact, they increased by nearly 13 percent, as compared to an increase of 21 percent in the control group. These findings refute the common belief that flexitime reduces short term absences more than long term absences. In addition, as the authors themselves pointed out, "experimentals and comparisons started from substantially different bases" (1974, p. 528). This initial difference should have been taken into account when experimental and control groups were compared on criterion variables. In the second study, Harvey and Luthans (1979), investigating the effect of flexitime on employee attendance in a state agency, concluded that flexitime appears to have a relatively favorable effect on absenteeism. However, they did not offer any statistical treatment of the absenteeism data in their study. As is frequently the case, the positive effect of flexitime on employee attendance has been claimed with relatively tenuous empirical evidence.

Studies investigating the impact of flexitime on performance are just as limited as are those on absenteeism. One notable exception is a study by Schein, Maurer, and Novak (1977). They investigated the impact of flexitime on the performance of 246 clerical level employees in five production units within a large financial institution over a period of four months. For two of the production units, in which both an experimentally designated control group and pre- and post-measures were employed, the results revealed no significant differences in performance between the experimental and control groups. In another production unit, however, productivity during the flexitime period was found to be significantly greater than that in the same period of the previous year. Based on these findings, the authors suggested that no clear-cut conclusions with respect to performance can be offered but that flexitime appears to have no adverse impact on it. In that study, however, the potential changes in the total work hours resulting from the flexitime program were not taken into account in measuring productivity. Because the flexitime program has been reported to influence the employees' attending behavior (Golembiewski et al., 1974; Harvey & Luthans, 1979), the results of the Schein et al. study on productivity may have been attributable in part to the confounding of the criterion measure with the changes in the total hours worked during the experimental period.

The present study attempts to remedy some of the methodological weaknesses of previous studies in several important ways. First, this study employs a pre-intervention measure of each criterion for both the experimental and the control group. This allows the necessary adjustment of criterion variables for the initial differences between groups. Second, this study investigates the effectiveness of flexitime using "hard" criterion measures. Especially, it uses the performance efficiency measure after the potential impact of flexitime on attendance behavior is taken into account. This permits testing whether employees under the flexitime program are performing more efficiently on an hourly basis. Third, the nature of the task under investigation is taken into account when performance measures are analyzed because Nollen (1979) suggested that employees' behavioral responses to flexitime tend to vary with different types of tasks. Fourth, this study attempts to increase the external validity of the findings reported by Schein et al. (1977) by investigating the same research issues in a public sector setting. According to Nollen (1979), there is some evidence suggesting that flexitime has a greater impact on performance in the private than in the public sector. Given the increasing number of flexitime implementations in the public sector, such information is required in order to guide future action.

The research issues investigated in this study are:

(1) Does the flexitime program affect the employees' absenteeism?
(2) Does the flexitime program affect the employees' performance efficiency?

## METHOD

### Subjects and Procedure

A total of 353 employees in 4 divisions of a county welfare agency participated in this study. Each division consisted of several administrative units, and each administrative unit was supervised by a common superior. Approximately 78 percent of the participants were female, 53 percent were black, and 90 percent had at least a high school education or some college training. The participants were responsible primarily for determining the eligibility of welfare cases and were all at the same organizational level.

A nonequivalent control group design was employed in this study. Prior to the flexitime intervention, the administrative units in each division were randomly assigned to the experimental group and to the control group. This randomization procedure, repeated in each division, allowed approximately equal numbers of employees in the experimental group and the control group.

The employees participating in the experimental group were allowed to begin their work any time between 6:30 a.m. and 9:30 a.m. and leave between 3:00 p.m. and 6:00 p.m. (the designated pre- and post-work band). All employee participants were required to be at work between the hours of 9:30 a.m. and 3:00 p.m. (the designated core time). In addition, all participants were required to work an 8-hour day. Those employees assigned to the control group continued to work their normal 8-hour days (8:00 a.m. to 4:30 p.m.). All employees who had overtime had the choice of taking one and a half compensatory time-off or taking one and a half overtime pay. During the four months of the experimental period, there was no change in the supervisory personnel in any of the administrative units under investigation.

### Measures

The criterion measures were collected on each participant in the experimental and control groups from organizational records for the month prior to the flexitime intervention and for the subsequent four months of the intervention period. Two different types of absenteeism were obtained: paid absences and unpaid absences. Each of these was divided further into short-term and long-term absences. Short-term paid absences for an employee were operationally defined as a monthly total of paid absences (i.e., sick leave) which was taken in blocks of two hours or less a day. Long-term paid absences were operationally defined as the monthly total of paid absences taken in blocks of more than two hours a day.

Similarly, short-term unpaid absences for an employee were operationally defined as the monthly total of leave time without pay that amounted to two hours or less a day. Long-term unpaid absences were operationally defined as the monthly total of leave time without pay that amounted to over two hours a day. These four measures defined on an a priori basis were available for 161 employees in the experimental group and for 185 employees in the control group.

In regard to performance, it was found that four divisions under the study varied as to the required routine actions, the client contact, the nature of the cases to be processed, etc. Consequently, this agency had employed different performance measures in each of these divisions. Therefore, in order to provide a basis for comparison, a performance efficiency measure was computed and was standardized within each division across the 5-month period. The performance efficiency measure for an employee was operationally defined as the rate of output quantity per hour by computing the ratio of monthly output to the actual hours worked during a given month. The actual hours worked during the month were obtained by subtracting the total hours of absences, vacation time, and compensatory leave time from the total work hours available plus overtime worked for the month. These performance efficiency measures, analyzed for each separate division, included: (1) the total number of cases approved during the month for Division 1; (2) the total number of routine actions completed during the month for Division 2; (3) the total number of cases processed during the month for Division 3, and (4) the total number of cases processed during the month for Division 4. To supplement the four division analyses, the performance efficiency measure was standardized within each division to provide the basis for comparison across all four divisions.

It was learned that this agency had been monitoring the employees' attendance behavior much more closely than it had the producing behavior such as output quantity. Consequently, when the measures to compute performance efficiency were compiled, it was found that for only 94 employees was there a complete set of necessary data (i.e., output measure, paid and unpaid absences, compensatory leave time, vacation time, overtime, etc.) for each of the five months of the intervention period. All data were compiled by the employees in the personnel department from the centralized standard logs and organizational records, which the unit supervisors were required to report on a monthly basis.

In order to control for the pre-intervention differences between the experimental and the control group, analysis of covariance using the pre-intervention measure as a covariate was employed in analyzing the criterion variables for each separate division and for the four divisions combined.

## RESULTS

Table 1 is a summary of the means, adjusted means, and standard deviations of the short-term and the long-term unpaid absences. The

## TABLE 1
## Summary of Means, Adjusted Means, and Standard Deviations of Unpaid Absences
## ($N = 346$)

| Criterion Measures | PRE |  | 1-Month |  | 2-Month |  | 3-Month |  | 4-Month |  | Marginal Means[b] |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | M | SD | M | SD | M | SD | M | SD | M | SD |  |
| *Short-term unpaid absences:* |  |  |  |  |  |  |  |  |  |  |  |
| Experimental group ($n = 161$) | .192 | .583 | .124<br>(.128)[a] | .527 | .118<br>(.122) | .442 | .161<br>(.166) | .517 | .093<br>(.097) | .400 | .124<br>(.128) |
| Control group ($n = 185$) | .218 | .742 | .256<br>(.252) | .783 | .262<br>(.258) | .807 | .332<br>(.328) | 1.062 | .267<br>(.263) | .794 | .279<br>(.275) |
| *Long-term unpaid absences:* |  |  |  |  |  |  |  |  |  |  |  |
| Experimental group ($n = 161$) | 4.232 | 19.384 | 1.335<br>(1.281) | 5.032 | 2.962<br>(2.909) | 8.913 | 3.422<br>(3.368) | 11.346 | 1.465<br>(1.412) | 5.222 | 2.296<br>(2.242) |
| Control group ($n = 185$) | 2.005 | 6.937 | 2.389<br>(2.435) | 8.420 | 3.921<br>(3.968) | 11.567 | 4.662<br>(4.708) | 20.510 | 4.921<br>(4.968) | 35.921 | 3.973<br>(4.019) |

[a] The adjusted means using the monthly measure immediately preceding the intervention as covariate.

[b] The average of the criterion measure for the four month intervention period combined.

## TABLE 2
## Summary of Means, Adjusted Means, and Standard Deviations of Paid Absences
## ($N = 346$)

| Criterion Measures | PRE |  | 1-Month |  | 2-Month |  | 3-Month |  | 4-Month |  | Marginal Means[b] |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | M | SD | M | SD | M | SD | M | SD | M | SD |  |
| *Short-term paid absences:* |  |  |  |  |  |  |  |  |  |  |  |
| Experimental group ($n = 161$) | .503 | 1.108 | .422<br>(.418)[a] | .944 | .332<br>(.328) | .815 | .403<br>(.399) | .809 | .319<br>(.315) | .793 | .369<br>(.365) |
| Control group ($n = 185$) | .368 | .873 | .256<br>(.260) | .636 | .244<br>(.228) | .582 | .291<br>(.295) | .796 | .397<br>(.400) | .834 | .292<br>(.295) |
| *Long-term paid absences:* |  |  |  |  |  |  |  |  |  |  |  |
| Experimental group ($n = 161$) | 9.875 | 10.619 | 6.732<br>(6.688) | 7.725 | 6.807<br>(6.762) | 7.583 | 8.416<br>(8.371) | 12.060 | 7.484<br>(7.439) | 7.635 | 7.359<br>(7.315) |
| Control group ($n = 185$) | 7.737 | 9.552 | 7.718<br>(7.757) | 14.602 | 8.762<br>(8.800) | 11.828 | 8.172<br>(8.211) | 8.912 | 7.659<br>(7.698) | 9.746 | 8.077<br>(8.116) |

[a] The adjusted means using the monthly measure immediately preceding the intervention as covariate.

[b] The average of the criterion measure for the four month intervention period combined.

adjusted mean of short-term unpaid absences during the 4-month intervention period was .128 for the experimental group and .275 for the control group. A 2 (experimental vs. control) × 4 (time) analysis of covariance using the pre-intervention measure as a covariate revealed a statistically significant difference between the experimental and the control group ($F_{1,343}=9.15$, $p<.002$). This result represents approximately a 35 percent decrease in the experimental group's short-term unpaid absences from the pre-flexitime period to the flexitime period, and there was about a 28 percent increase in the short-term unpaid absences among the employees in the control group. Neither the time effect nor the interaction effect was statistically significant.

Long-term unpaid absences in the experimental group decreased by 45 percent from the pre-flexitime period to the flexitime period. On the other hand, there was about a 98 percent increase in the same measure among the employees in the control group. This increase appears to be notable, but it did not reach a level of statistical significance when the initial difference between the experimental and the control group was accounted for ($F_{1,343}=2.24$; N.S.). As with short-term unpaid absences, neither the time effect nor the interaction effect was noted. Yet, the trend of the data on unpaid absences seems to be clear. Long-term unpaid absences were lower in the experimental group than in the control group in every month during the 4-month flexitime intervention period. In fact, the long-term absenteeism among the employees in the control group was more than three times greater than that in the experimental group for the last 30 days of the flexitime intervention.

Table 2 shows the findings on the short-term and the long-term paid absences taken by the employees in the experimental and the control groups. Although the short-term paid absences among the employees under the flexitime program were slightly greater than the same measure among the employees in the control group, no statistically significant difference was observed during the 4-month intervention period ($M'=.365$ vs. $M'=.295$; $F_{1,343}=2.27$, N.S.). Neither time effect nor the group by time interaction effect was statistically significant. For the long-term paid absences, the findings were reversed with the similar statistical results. The employees under the flexitime program tended to show a lower amount of paid absenteeism than those in the control group, but this difference did not reach a statistical level of significance. Again, neither time effect nor the group by time interaction effect was statistically significant.

As suggested earlier, two different analyses were conducted for performance efficiency: (1) four separate division analyses to account for the variations in the nature of the task; and (2) a combined analysis across the four divisions to increase the degree of generalizability. Table 3 shows the summary of means, adjusted means, and standard deviations of performance efficiency for each of the four divisions under study.

For division 1, the adjusted mean for the experimental group was .803 as compared to .583 for the control group during the 4-month intervention

## TABLE 3
## Summary of Means, Adjusted Means, and Standard Deviations of Performance Efficiency in Four Divisions
## ($N=94$)

| Criterion Measures[a] | PRE |  | 1-Month |  | 2-Month |  | 3-Month |  | 4-Month |  | Marginal Means[c] |
|---|---|---|---|---|---|---|---|---|---|---|---|
|  | M | SD | M | SD | M | SD | M | SD | M | SD |  |
| *Division 1:* |  |  |  |  |  |  |  |  |  |  |  |
| Experimental group ($n=6$) | .507 | .586 | .768<br>(.793)[b] | .559 | .802<br>(.833) | .671 | .671<br>(.699) | .598 | .590<br>(.889) | .157 | .707<br>(.803) |
| Control group ($n=5$) | .568 | .032 | .763<br>(.733) | .190 | .587<br>(.550) | .082 | .553<br>(.500) | .082 | .804<br>(.549) | .746 | .676<br>(.583) |
| *Division 2:* |  |  |  |  |  |  |  |  |  |  |  |
| Experimental group ($n=14$) | .725 | .314 | .948<br>(.969) | .332 | .745<br>(.758) | .332 | .873<br>(.887) | .279 | .794<br>(.808) | .260 | .840<br>(.855) |
| Control group ($n=16$) | .769 | .288 | .732<br>(.714) | .342 | .681<br>(.671) | .408 | .827<br>(.814) | .375 | .741<br>(.728) | .450 | .745<br>(.731) |
| *Division 3:* |  |  |  |  |  |  |  |  |  |  |  |
| Experimental group ($n=16$) | .286 | .114 | .301<br>(.285) | .120 | .300<br>(.281) | .131 | .246<br>(.238) | .069 | .263<br>(.250) | .075 | .277<br>(.263) |
| Control group ($n=26$) | .237 | .075 | .262<br>(.271) | .085 | .259<br>(.271) | .097 | .248<br>(.253) | .089 | .224<br>(.232) | .107 | .248<br>(.256) |
| *Division 4:* |  |  |  |  |  |  |  |  |  |  |  |
| Experimental group ($n=6$) | .165 | .067 | .177<br>(.178) | .078 | .247<br>(.249) | .120 | .240<br>(.240) | .130 | .172<br>(.172) | .083 | .209<br>(.209) |
| Control group ($n=5$) | .168 | .162 | .164<br>(.164) | .104 | .395<br>(.393) | .472 | .194<br>(.193) | .079 | .234<br>(.234) | .055 | .246<br>(.246) |

[a] Division 1: Hourly rate of cases approved during the month; Division 2: Hourly rate of routine actions completed during the month; Division 3: Hourly rate of cases processed during the month; Division 4: Hourly rate of cases processed during the month.

[b] Thc adjusted means using the monthly measures immediately preceding the intervention as covariate.

[c] The average of the criterion measure for the four month intervention period combined.

period. A 2 (experimental vs. control) × 4 (time) analysis of covariance using the pre-intervention measure as a covariate revealed a statistically significant difference between the experimental and the control group ($F_{1,8} = 12.642$; $p < .007$). Although the pattern of performance efficiency between the two groups appeared to be different during the experimental period, the group by time interaction effect failed to reach a statistical level of significance ($F_{3,24} = 1.948$; N.S.). The results for the remaining three divisions showed that neither the main nor the interaction effect was statistically significant. Yet, in two (divisions 2 and 3) of these three divisions, performance efficiency tended to be higher for the experimental group than for the control group. For example, when the initial difference in performance efficiency prior to the intervention was accounted for, it was found that the average hourly rate of routine actions completed for the experimental group in division 2 was about 17 percent higher than that for the control group during the intervention period. In division 4, a reversed trend was shown. The average hourly rate of cases processed for the experimental group was about 16 percent lower than that for the control group during the intervention period.

Table 4 shows the findings on the standardized performance efficiency for all four divisions combined. The standardized average performance efficiency adjusted for the initial difference was higher for the experimental group ($M' = .109$) than for the control group ($M' = -.076$). However, this difference did not reach a statistical level of significance ($F_{1,91} = 1.590$; N.S.). Neither the time effect nor the group by time interaction effect was statistically significant.

Although excluded from the overall experimental design of this study, additional data were obtained by an evaluation committee of seven agency members on the employees' reactions on the flexitime time. The employees' responses to the flexitime program, obtained by the questionnaire after the intervention period, were very favorable. For example, among those in the experimental group, approximately 84 percent reported that flexitime had a strong positive influence on their morale; 92 percent reported that the flexitime program had a strong influence on arranging time for personal matters outside of agency hours; 62 percent reported that the flexitime program improved their job satisfaction; 88 percent reported that the flexitime program had a strong positive effect on the reduction of morning tension; 91 percent reported that flexitime had a positive influence on the reduction of commuting time and traffic congestion problems, and 61 percent reported that the flexitime program reduced their parking problem.

## CONCLUSION AND DISCUSSION

In spite of a general lack of empirical supports, it has been often suggested that the employees under a flexitime program would reduce absenteeism and increase their productivity. The results of this study suggest

## TABLE 4
## Summary of Means, Adjusted Means, and Standard Deviations of Standardized Performance Efficiency in Four Divisions Combined
## ($N = 94$)

| Criterion Measures | PRE | | 1-Month | | 2-Month | | 3-Month | | 4-Month | | Marginal Means[b] |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* | |
| Experimental group ($n = 42$) | .095 | 1.192 | .246<br>(.195)[a] | 1.118 | .154<br>(.107) | 1.065 | .121<br>(.080) | 1.092 | .098<br>(.057) | .972 | .154<br>(.109) |
| Control group ($n = 52$) | –.055 | .895 | –.148<br>(–.107) | .884 | –.053<br>(–.015) | .959 | –.044<br>(–.011) | 1.017 | –.100<br>(–.067) | 1.049 | –.086<br>(–.076) |

[a] The adjusted means using the monthly measure immediately preceding the intervention as covariate.

[b] The average of the criterion measure for the four month intervention period combined.

that flexitime significantly reduces employees' unpaid absences in general. However, the positive impact of flexitime on short-term unpaid absenteeism (leave without pay for two hours or less a day) appears to be much stronger than on the long-term unpaid absenteeism (leave without pay for more than two hours a day). This finding suggests that the flexible working hours allowed under the flexitime program have served as a substitute for short-term leave without pay. This substitutability was not apparent for the long-term unpaid absences. However, no substantial increase or decrease in paid absences was noted. Employees under the flexitime program tend to take just as many paid absences (i.e., sick leave) as the employee with regular work hours.

As stated earlier, empirical studies investigating the effect of flexitime on performance are virtually nonexistent. One study by Schein et al. (1977) suggested that a flexitime program has no adverse impact on performance in a private sector organization. The results of the present study, conducted in a public sector agency, concurs with that finding. In three out of four divisions, the performance during the 4-month flexitime period was higher in the experimental group than in the control group, although in only one of these divisions did it reach a statistical level of significance. Thus, one may conclude that flexitime had either a positive impact on performance or did, at a minimum, encourage an increase in performance among public employees.

The results of this study imply that the employees under flexitime tend to take it as an alternative benefit to be used for nonwork activities without affecting their economic benefits. This would imply that, although one may expect the reduction of employees' leave without pay under the flexitime program, the costs associated with absenteeism would not necessarily be reduced. Yet, to the extent to which flexitime increases efficiency of labor input, the overall organizational effectiveness can be enhanced.

However, the findings also imply that the potential positive impact of flexitime on performance efficiency may not be constant across different tasks. For example, Partridge (1973) reported findings that suggest that flexitime tended to hinder managers in supervising their staffs, in fitting in with unpredictable work times, and in setting up formal meetings in the office. He concluded that flexitime can generate difficulties in coordinating subordinates' activities that arise from uneven work flow. One can argue that the degree of difficulty caused by flexitime would vary according to the kind of coordination needed for the completion of a certain task. If the job requires an extensive communication and information exchange among supervisors, co-workers, clients, etc., the potential payoff in performance under flexitime may be low. On the positive side, if the nature of the task and task interdependence is such that each employee can perform an entire module in a relatively autonomous manner (i.e., pooled interdependence), performance can be increased under the flexitime program. Because the nature of interdependence and coordination needs for task completion was not measured in this study, one can only speculate on the validity of this argument. However, if it is valid, it implies that the nature of the task should be considered carefully before a decision to implement flexitime is made. For example, if the nature of the task is sequential in nature (i.e., assembly line), the implementation of flexitime would not be feasible or would incur a considerable increase in coordination costs in production.

Two methodological limitations of this study should be noted. First, the employees in both the control group and the experimental group knew that they were participating in a field experiment and that the results of this experiment would have potential influence on policy decisions on flexitime program implementation for the entire agency. Because the employees were not "blind" to what was taking place, their responses might have been influenced by the "Hawthorne effect" and/or by a "Rosenthal effect." This possibility could not be totally ruled out from the current research context: the policy of this agency was such that the employees were kept informed on this flexitime experiment. However, the employees, including supervisors, did not have knowledge as to which criteria would be employed in evaluating flexitime effectiveness. Further, because (1) the employees were led to believe the questionnaire responses to be the primary data source for the evaluation of the flexitime program and (2) the criterion measures were compiled from the centralized data pool by a third party, the possible influence of the *expectations* on the experimental group would have been minimal. Second, subjects were not selected completely at random. However, the intact groups (i.e., administrative units) were chosen randomly and assigned to the experimental and the control group for each division. They thus shared all practical bases such as common tasks, common supervision, and common level. Thus, meaningful comparisons could be made in each division.

Notwithstanding these limitations, the results of this study appear to justify the argument that the flexitime program has a positive impact on attendance and performance among public sector employees. It should be noted that this study investigated only one of several forms of the flexitime program. Additional research on various other forms of the flexitime program in different organizational contexts is clearly warranted. Future studies might fruitfully investigate the potential moderating effect of task on the effectiveness of flexitime as an organization development intervention.

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# The Effect of Intentions, Tenure, Personal, and Organizational Variables on Managerial Turnover

**JAMES O. MITCHEL**
**Life Insurance Marketing and Research Association**

*Several aspects of a model of turnover were tested with a sample of managers using a cross-validated, multiple regression design. The relative importance of intentions was affirmed. Tenure was also found to contribute, but personal and organizational variables were not related to either turnover or intentions.*

Turnover of organization members, especially managerial personnel, can be costly to an organization (Cawsey & Wedley, 1979). The cost associated with replacing a long tenured manager is quite visible; however, replacing a manager, particularly a marginally effective one, may also have positive effects that could outweigh the cost. The change could improve the effectiveness of the organization or foster innovation in the organization (Dalton & Todor, 1979). Relative to the ramifications to an organization, both negative and positive, that changing managers can have, there are relatively few studies of managerial turnover (Mobley, Griffeth, Hand, & Meglino, 1979; Porter & Steers, 1973). Part of this scarcity might be due to the low turnover rate of managers and their small number in any one organization, which makes the study of managerial turnover a difficult research area (Porter & Lawler, 1965).

Current research views turnover as determined by multiple factors, and several models have been proposed that attempt to link together these multiple determinates (Farris, 1971; Mobley et al., 1979; Price, 1977). The Mobley et al. model, for example, proposes that intentions are the immediate precursor of turnover. Intentions are determined primarily by (a) satisfaction, (b) attraction and expected utility of the present job, and (c) attraction and expected utility of alternative jobs or roles. These determinates can be moderated by the centrality of work values or the nonwork consequences of quitting, and organizational, economic, personal, and occupational variables are included as antecedents of perception, values, and expectations.

The present study was conducted to generate more evidence on the appropriateness of the Mobley model, particularly as it applies to managers who have been in this role for some time. The study attempted to extend some of the prior findings concerning turnover (which have been based primarily on nonmanagerial personnel) to a sample of incumbent managers.

In addition, the present study incorporated several of the methodological recommendations of Mobley et al. (1979). First, a multivariate design was utilized in order to be able to assess the relative contributions of the independent variables. Second, the relationships discovered were cross-validated. Finally, tenure was included in the multivariate design in order to understand further the role of time on turnover.

The primary concern of the present research was the role of intentions, tenure, and individual and organizational antecedents. Based on the Mobley model, *it was hypothesized that intentions would have the strongest relationships to turnover, and individual and organizational variables would have a weak relationship to turnover but a stronger relationship to intentions.* Finally, *tenure was hypothesized to be more strongly related to turnover than the antecedents but less strongly related to turnover than intentions.*

There is strong support for these hypotheses. Several studies have shown intentions to be more predictive of turnover than job satisfaction (Hom, Katerberg, & Hulin, 1979; Mobley, Horner, & Hollingsworth, 1978). In addition, previous research has documented a negative relationship between tenure and turnover (Mobley et al., 1979; Porter & Steers, 1973; Price, 1977). This relationship has implications for understanding the turnover process, especially if tenure is also related to other correlates of turnover. If tenure enters a regression equation predicting turnover, there is variance in the turnover process associated with whether or not the person is new to the position. This could mean that the reasons for turnover differ between new employees and incumbent employees. To investigate this, the present study included a sample of managers with a range of tenure in their present positions. Evidence also supports relationships between turnover and personal variables such as age (Mobley et al., 1979; Porter & Steers, 1973), and between turnover and combinations of biographical and demographic variables (Cascio, 1976; Owens, 1976; Schuh, 1967).

Because organizational variables have been found to affect managerial activity (Katzell, Barrett, Vann, & Hogan, 1968) and managerial performance (Ghiselli & Siegel, 1972), they may well be important in explaining turnover among managerial personnel. One organizational context variable—size of the organization or unit—is possibly related to turnover, at least for blue-collar workers (Porter & Steers, 1973). To explore more fully the possible effect of organizational variables, two additional organizational context variables were examined: the origin of the organizational unit and the ownership of the organizational unit. The specific aspect of origin examined was the impersonality of the origin (Pugh, Hickson, Hinnings, & Turner, 1969), which distinguishes between personally founded (entrepreneurial) organizations and those founded by existing organizations (bureaucratic). The aspect examined for organizational ownership was the relationship of ownership to management (Pugh et al., 1969). It was felt that if the manager of a unit was either the founder or owner, he or she would have more invested in the unit, stronger intentions to remain, and therefore would be less likely to terminate any relationship with the unit.

To summarize, the present research was an attempt to test several aspects of the Mobley model of turnover on a sample for which there has been lack of relevant research—that is, managers. As Mobley et al. (1979) note, to move toward a more complete understanding of the turnover process, variables must be studied together in order to assess the relative contribution of each variable. Therefore *it was specifically hypothesized that managers (a) with weak intentions to remain in their organizational unit, (b) with less tenure, (c) in larger organizational units, (d) who did not personally found their unit or (e) who do not have an ownership stake* (i.e., independent contractors) *would be more likely to terminate. It was* also *hypothesized that a composite of biographical and demographic variables would be related to turnover.* In terms of their relative contribution, *it was hypothesized that intentions would be the most important, followed by tenure, and then by the personal and organizational variables.*

## METHOD

### Sample

The sample consisted of 776 field agency managers from 43 life insurance companies in the United States and Canada. The sample was randomly divided into three subsamples for different phases of the analysis. The first subsample of 263 managers was used as a preliminary pilot sample to construct the intentions and biographical composite variables. The second subsample of 274 managers was used to develop the regression equation. The third subsample of 239 managers was used to cross-validate the equation. Company averages were substituted for any missing data. (The amount of missing data was small. At most, 6 percent of the cases were missing on a variable.)

The agency manager is the main field management position in life insurance companies. The manager is housed apart from the main company office but usually reports to a home office supervisor. The manager supervises agents, clerical staff, and second-line management personnel in the agency.

The typical manager in the sample was 47 years old, had about 2 years of college education, and had been in the life insurance business for about 18 years, of which 5 years were as a selling agent and 13 years were in management. All were male with an average tenure in their present position of seven years.

### Variables

The organizational and personal variables used in the study were collected as part of a larger survey of 1,119 life insurance agency managers. These 1,119 managers completed and returned a mailed questionnaire that contained all the variables used in the present study, with the exception of turnover. Turnover data were collected at a later date.

*Turnover*—Three years after the initial data collection, the companies provided information on all managers in the sample who had terminated within the 3-year period. The companies provided both the date of termination and the reason for termination. The 3-year exposure period was chosen because of the dip in retention rates after three years (Study of Agency Heads, 1976) and because a shorter period would not have provided sufficient criterion variance. For example, a 1-year period would have a turnover rate of less than 10 percent.

Although there are many reasons why a position becomes vacant, the present study attempted to relate only personal and organizational factors to turnover. Therefore, turnover due to such nonwork related reasons as retirement or death was not examined. Because individual intentions were a variable of interest, turnover resulting from promotions or transfers was not examined either. Neither of these is under the individual's own intentional control in the same manner that turnover is. These considerations necessitated eliminating certain cases from the large study.

The larger sample of 1,119 managers was reduced to 776 cases by excluding the 259 managers who assumed their position as manager as a result of a lateral transfer and by excluding the 84 managers who terminated because of death, disability, retirement, transfer, or promotion. This resulted in 191 terminators and 585 survivors, or a 3-year turnover rate of 24.6 percent. Fortunately, this is not an extreme rate, so criterion variance was relatively unrestricted (Miller, Katerberg, & Hulin, 1979).

*Job Tenure*—The initial questionnaire asked the manager to indicate how many years he had been in his present position. Responses that included months were truncated to whole years.

*Size*—The size of the manager's organizational unit was measured in three different ways: (a) number of employees—number of full time sales personnel currently in the unit, (b) number of supervisors—number of production supervisors currently in the unit, and (c) number of initial employees—number of full time sales personnel in the unit when the manager took over the unit. All these variables were furnished by the manager in the initial questionnaire. The number of current employees and supervisors represents the size of the unit prior to turnover exposure.

*Origin*—The origin of the organizational unit was measured by a dichotomous item in the questionnaire, asking the manager whether the unit was in existence when the manager took over or whether the manager was an entrepreneur and started the unit from scratch without initial staff or prior production.

*Ownership*—The ownership of the unit by the manager was measured by a dichotomous item in the questionnaire asking about the contractual relationship between the manager and the company. The relationship could be one of either an independent contractor or a branch office. Independent contractors have more vested interest in the performance of the agency and more direct control than do branch managers.

*Intentions*—A number of individual variables were available for the remaining two construct classes. Therefore these were grouped to enhance reliability (Miller et al., 1979). The intention of the manager to remain in his present position was measured by averaging the responses to four items in the questionnaire. The items were: (a) "I plan to be with the company quite a while," (b) "Sometimes I get so irritated I think about changing jobs" (reverse scored), (c) "I plan to be with the company five years from now," and (d) "I would turn down a contract offer from another company if it came tomorrow." The managers responded on a 5-point scale with verbal anchors ranging from "not accurate at all" (scored 1) to "extremely accurate" (scored 5). The coefficient alpha reliability of this scale was estimated in the pilot subsample to be .64. The corrected item-total correlations ranged from .35 to .51. Even though item (b) is reverse scored, its exclusion would not significantly change the reliability (.64 to .66) but would reduce the scale variance. It thus appeared that these four items formed a relatively homogeneous and discriminating scale.

*Biographical Key*—The questionnaire contained several background and work history items. Of these, 26 were examined using weighted application blank techniques to develop a predictor key for subsequent survival. The pilot subsample was used to develop the key. The percent of terminators and survivors in the pilot subsample that checked each coded response option was computed for each question. Seven items had significant ($p<.10$) chi-squares. These items covered such areas as time in previous positions, positions with other companies, performance as a selling agent, and training as an agent. The items were combined to form a key to predict survival. The response alternatives were weighted as suggested by England (1971). The scores obtained from this biographical key were used as one of the independent variables in the subsequent analysis. The zero order correlation of the key with turnover in the pilot subsample was $r=-.36$ ($p<.01$).

## Analysis

The first step in the analysis was to check for significant differences among the three subsamples on the variables used in the analysis. This was done to rule out any possible bias in the subsequent analyses that may have resulted from mean differences on the variables across the subsamples.

The major analysis consisted of a multiple regression of the eight independent variables on turnover. Because the intentions composite and biographical key were constructed based on actual data, they capitalized on any change relationships in the data. Had these been combined with the other independent variables in a regression equation in the same sample in which they were developed, the relative contribution of intentions and the biographical key may have been overestimated. Therefore, the second subsample was used to develop the regression equation. The equation then was applied to the third subsample to cross-validate the results.

## RESULTS

One-way ANOVAs were run on the eight independent variables, turnover, and the seven items used in the biographical key. There were no significant differences across the three subsamples. Examination of the means and standard deviations in Tables 1 and 2 indicates the similarity of the samples used in the development and cross-validation of the equation. It also is apparent that there is adequate variance in all the variables.

The intercorrelations of the variables in the second subsample are presented in Table 1. Turnover is significantly correlated with intentions, tenure, number of employees, and number of supervisors. The largest correlation is $r=-.29$ between intentions and turnover. There does not appear to be any major multicollinearity, except possibly among the three size measures. Their average intercorrelation is about .60. Contrary to expectation, the score from the biographical key developed in the pilot subsample does not hold up under cross-validation. The correlation of the key with turnover in the second subsample is $r=-.08$, which is not significant.

The multiple regression equation was computed to examine the relative contribution of the variables. The multiple correlation of $R=.40$ is significant. Only two variables make a significant contribution to the equation—intentions and tenure. Intentions have a larger regression weight than does tenure. None of the organizational context variables or personal variables makes a significant contribution to the equation. This is contrary to the original hypothesis.

Because only two variables make significant contributions to the equation, the inclusion of the other five variables in the equation would only add error. Therefore, the regression weights for the equation were recomputed using only intentions and turnover. The recomputed multiple correlation is $R=.37$. The weights from this equation were applied to the third subsample to cross-validate the magnitude of the relationship. The relationship did cross-validate. The correlation in the third sample is $r=.26$, which is significant ($p<.01$). For comparison purposes, the intercorrelations of the variables in the third subsample are presented in Table 2. The pattern of the correlations is essentially the same as in the second

## TABLE 1
## Means, Standard Deviations, Intercorrelations, and Standardized Regression Weights in Developmental Sample[a]

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | $\overline{X}$ | SD | beta | F | p |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Tenure | | | | | | | | | 7.53 | 6.20 | -.148 | 4.92 | <.05 |
| 2. Number of employees | .19 | | | | | | | | 11.56 | 8.97 | -.134 | 1.74 | |
| 3. Number of supervisors | .19 | .71 | | | | | | | .96 | 1.27 | -.053 | .40 | |
| 4. Number of initial employees | -.11 | .65 | .41 | | | | | | 4.95 | 6.92 | .078 | .78 | |
| 5. Origin[b] | -.09 | .16 | .03 | .44 | | | | | 1.73 | .44 | -.026 | .15 | |
| 6. Ownership[c] | -.26 | .15 | .21 | .14 | .18 | | | | 1.51 | .50 | .110 | 2.96 | |
| 7. Intentions | -.05 | .03 | .07 | .00 | -.03 | .04 | | | 4.57 | .63 | -.301 | 26.88 | <.001 |
| 8. Biographical key | .27 | .20 | .12 | .19 | .13 | -.19 | -.06 | | 6.11 | 6.23 | -.007 | .01 | |
| 9. Turnover[d] | -.20 | -.15 | -.14 | -.01 | .02 | .11 | -.29 | -.08 | 1.23 | .42 | | | |

$R = .40$, $F = 5.98$, $p < .001$

[a] For sample size of $n = 263$ an $r = .12$ is significant at $p < .05$.
[b] Coded 1 = scratch and 2 = existing agency.
[c] Coded 1 = independent contractor and 2 = branch office.
[d] Coded 1 = survivor and 2 = terminator.

## TABLE 2
## Means, Standard Deviations, Intercorrelations, and Standardized Regression Weights in Subsample Three[a]

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | $\overline{X}$ | SD | beta | F | p |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Tenure | | | | | | | | | 6.79 | 6.61 | -.113 | 3.12 | |
| 2. Number of employees | .28 | | | | | | | | 11.18 | 7.84 | -.009 | .02 | |
| 3. Number of supervisors | .08 | .31 | | | | | | | .85 | 1.45 | -.059 | .86 | |
| 4. Number of initial employees | -.05 | .45 | .21 | | | | | | 5.05 | 6.31 | -.106 | 2.14 | |
| 5. Origin[b] | -.03 | .27 | .14 | .47 | | | | | 1.74 | .44 | .079 | 1.39 | |
| 6. Ownership[c] | -.06 | .33 | .23 | .23 | .23 | | | | 1.57 | .50 | .084 | 1.67 | |
| 7. Intentions | -.02 | .07 | .10 | .00 | -.05 | .10 | | | 4.62 | .55 | -.193 | 10.42 | <.001 |
| 8. Biographical key | .27 | .19 | .06 | .08 | .11 | -.04 | -.07 | | 6.19 | 6.35 | -.010 | 2.57 | |
| 9. Turnover[d] | -.16 | -.09 | -.08 | -.08 | .03 | .08 | -.21 | -.11 | 1.26 | .44 | | | |

$R = .30$, $F = 3.36$, $p < .01$

[a] For sample size of $n = 274$ an $r = .12$ is significant at $p < .05$.
[b] Coded 1 = scratch and 2 = existing agency.
[c] Coded 1 = independent contractor and 2 = branch office.
[d] Coded 1 = survivor and 2 = terminator.

subsample, with the exception of less multicollinearity among the size measures.

Again in the third subsample the biographical key did not cross-validate. It must be concluded that turnover of the managers in this sample is not predictable from the biographical items used. Turnover is again significantly correlated with intentions and tenure. However, contrary to the second subsample results, no organizational context variable is significantly correlated with turnover; the relationship of the number of employees and the number of supervisors to turnover found in the second subsample failed to hold up on the cross-validation subsample.

## DISCUSSION

The major finding of the present study is the relationship between the intention to quit and subsequent termination. This supports the Mobley model for a sample of incumbent managers. These results, coupled with two closely related studies of managerial trainees (Porter, Crampon, & Smith, 1976) and army officers (Butler & Bridges, 1978), suggest that withdrawal intentions, or the more general organizational commitment, are determinates of turnover decisions among incumbent managers as well as among blue-collar workers.

Tenure also was found to be correlated with turnover, although weaker than intentions, but not significantly so ($p > .05$). In the regression equation tenure did add unique variance. This is consistent with the Mobley model, which proposes that intentions are a major, but not the sole, determinate of turnover.

Tenure's contribution to the equation emphasizes that time variables need to be examined in turnover research. There is the possibility that the turnover process may be different for new managers than it is for longer tenure managers. However, because tenure is correlated with intentions, intentions probably are a component of the turnover process for new as well as old managers. Other time variables, such as length of exposure period, also may be important in turnover research. Unfortunately, it was not possible to examine these with the present data. Further research, however, should consider multiple measurement over time of dependent variables as well as turnover.

The data do not support two of the hypotheses. Both concern the personal and organizational antecedents. The composite of biographical and demographical variables and the organizational size measures were not found to have a cross-validated relationship with turnover. In addition, none of the antecedent variables was found to be related to intentions as had been hypothesized.

These results concerning size and biographical data are contrary to some previous research evidence. In a sample of blue-collar workers, Wanous, Stumpf, and Bedrosian (1979) found organizational variables to be stronger predictors of survival than individual difference variables. Porter and Steers (1973) and Price (1977) in their reviews did not find organizational or unit size consistently related to turnover. Although an agency is usually relatively stable in size, it is possible that the size could have changed in the 3-year period when turnover data were collected. If in fact this did occur, it could be a possible explanation for not finding size to be related to turnover. Combined with the present results, the evidence suggests that unit size is not an important antecedent of managerial turnover.

The failure of the biographical key to predict turnover is at odds with previous research. Schuh (1967) reviewed several successful applications for nonmanagerial turnover. However, Schwab and Oliver (1974) criticized the findings because of the lack of cross-validation in many of the studies. There are two possible reasons for the failure to find any relationship in the present study. First, the number of initial items may have been too small. A number of the successful uses of biodata include composites of over 100 variables (Owens, 1976), but this study started with only 26 variables. Second, biographical items are usually used to predict turnover of *new* personnel. However, the present sample looked at existing personnel, some of whom had been in the position for more than 20 years. The relationship of the items to turnover may be different for different tenure groups, so that when the groups are combined, little relationship is evident for the total group. The correlation of the biographical composite with tenure ($r = .27$) suggests that this may be true.

The lack of any relationship between intentions and the other independent variables in the study is of note. Steers (1977) found the antecedents of organizational commitment to be quite diverse, including personal characteristics, job characteristics, and work experiences. Similarly, Martin (1979) found structural/process variables, environmental variables, demographic variables, and the mediating effect of job satisfaction to be related to intentions.

Stevens, Beyer, and Trice (1978) studied the antecedents of the commitment of managers. They examined commitment within a role taking and exchange framework, which included personal, role related, and organizational variables. They found role related factors to be the most important predictors. Stevens et al. (1978) found organizational tenure to be correlated with commitment. Positional tenure, which was used in the present study, was not found to be related to commitment. Although Stevens et al. also had hypothesized that organizational variables would be important, their results did not support this conclusion. They suggested that the influence might be moderated by role related variables such as work overload. Role variables are perceptual variables, and Mobley et al. (1979) do point out that the effect of antecedent variables in the turnover process is through their effect on individual perceptions. The present study did not include perceptual variables. Thus this aspect of the model could not be tested. However, the lack of any direct connection between the antecedent variables and turnover does make role perception a viable alternative hypothesis.

In summary, a major component of the Mobley model of turnover was supported in a sample of managers. Although the role of intentions in the turnover process was supported, the study questions the direct effect of personal and organizational context variables on turnover or intentions. If organizational variables have an effect on turnover, it is probably through role perceptions. The perceptual component of the Mobley model needs to be tested with managerial personnel if the effect of organizational variables on managerial turnover is to be fully understood.

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# *Capturing Rater Policies in Evaluating Candidates for Promotion*

**STEPHEN A. STUMPF**
**New York University**
**MANUEL LONDON**
**American Telephone and Telegraph Company**

*Five criteria for evaluating candidates for promotion were investigated in a policy capturing study using manager and student samples. Six clusters of rater policies were observed which indicated the use of a single criterion, multiple criteria, and/or configural relationships. The value of a policy capturing methodology for investigating management decisions is discussed.*

Multiple criteria often are necessary to evaluate people for selection, compensation, and promotion (Dunnette, 1963, 1966; Ghiselli, 1956). The criteria are combined either mechanically or subjectively to make a decision. Substantial debate over when and how multiple criteria should be combined has occurred (Guion, 1961; Kavanagh, MacKinney, & Wolins, 1971; Schmidt & Kaplan, 1971; Smith, 1976; Zedeck & Blood, 1974). Guion (1961) has argued that criteria be validated separately and combined at the point of decision. Schmidt and Kaplan (1971) point out that subjective weights for combining criteria are not likely to be made explicit. Schmidt and Kaplan's argument, coupled with the sizable literature indicating the superiority of mechanical (or statistical) methods of combining criteria compared to judgmental (subjective) methods (Bass & Barrett, 1972; Campbell, Dunnette, Lawler, & Weick, 1970; Cascio, 1978; Dawes, 1971; Dawes & Corrigan, 1974; Sawyer, 1966), indicate the desirability of determining and systematizing the actual weights given to criteria (Smith, 1976).

One method used to determine statistical weights is termed policy capturing (Slovic & Lichtenstein, 1971). A policy capturing approach requires each decision maker to rate a large number of individuals who vary along several criteria. (The term "criteria" is used here to mean variables on which a decision is made. They may be considered predictors of the decision as well.) The decision maker's policy (i.e., the linear or configural relationships among the criteria) is inferred through statistical analysis of the ratings. Policy capturing has been used to investigate the importance of various performance criteria (Anderson, 1977; Naylor & Wherry, 1965; Taylor & Wilsted, 1974; Zedeck & Kafry, 1977), factors influencing one's choice of an organization or position (Feldman & Arnold, 1978; Sheard, 1970; Zedeck, 1977), factors related to individual motivation (Dachler & Mobley, 1973; Mitchell & Biglan, 1971), and the relative cue weighting in information processing tasks (Slovic & Lichtenstein, 1971; Wright, 1979).

This research investigates three aspects of rater policies used in considering individuals for management promotion: (1) the extent to which linear and nonlinear composite criteria models are employed, (2) the existence of clusters by similarity of policies, and (3) the similarity of statistically derived weights and the decision maker's subjective evaluation of the importance of various criteria.

Although policy capturing research has provided guidance for combining criteria, most research has been based on the assumption that decision makers process information in a linear rather than configural manner (Dawes & Corrigan, 1974; Payne, 1976; Slovic, Fischhoff, & Lichtenstein, 1977). For example, Feldman and Arnold (1978) and Zedeck and Kafry (1977) used regression weights for linear combination of criteria into a composite measure. The robustness of the linear model has preempted much investigation of nonlinear, configural, and/or noncompensatory cognitive processes (Einhorn, 1971; Payne, 1976; Payne, Braunstein, & Carroll, 1978; Slovic, 1969; Slovic et al., 1977; Tversky, 1969; Valenzi & Andrews, 1973).

Policy capturing methodologies assist in the identification of one or more sets of weights employed by a decision maker in combining criteria (Cook & Stewart, 1975; Schmitt & Levine, 1977); however, they do not index agreement or disagreement in different rater's policies. Several studies suggest that different criteria weighting may exist as a function of the decision maker and task situation (Feldman & Arnold, 1978; Slovic & Lichtenstein, 1971; Taylor & Wilsted, 1974; Wiggins, Hoffman, & Taber, 1969; Zedeck, 1977; Zedeck & Kafry, 1977). Failure to consider interactions or configural relationships among criteria as explanations of choice behavior reduces the likelihood of observing different clusters of rater policies because potentially accountable interaction variance is assumed to be error variance (Nystedt & Murphy, 1979).

Comparisons of statistical and subjective weights indicate only moderate agreement (Cook & Stewart, 1975; Huber, Sahney, & Ford, 1969). Relative to weights derived statistically, subjective weights underestimate the importance of major elements and overestimate the importance of minor elements (Feldman & Arnold, 1978; Slovic & Lichtenstein, 1971; Zedeck & Kafry, 1977). Decision makers perceive a more equal weighting of criteria than the statistical analysis indicates. If contingency relationships exist among criteria, then linearly derived statistical weights and subjective weights would not generally agree because the subjective weights may implicitly contain whatever interactions are operative in the choice process (Nystedt & Magnusson, 1976; Nystedt & Murphy, 1979). If so, considering interactions as explanations of choice behavior should increase the agreement of statistical and subjective weights.

As indicated above, policy capturing has been used to investigate a range of management decisions. The present study focuses on management promotions. Although there is a great deal of folklore regarding promotions and some research on employee perceptions of promotion decisions (Gemmill & DeSalvia, 1977; Beyer, Stevens, & Trice, 1980), little attention has been devoted to understanding the promotion decision making process (London & Stumpf, in press; Stumpf & London, in press). This study examines judgmental processes related to promotion decisions as the context for investigating rater policies.

## METHOD

### Subjects

Participating in the research as part of a class activity were 43 managers enrolled part time in a graduate program in business. The mean age of the group was 28.6, the standard deviation was 6.7 years. The average number of years of full time work experience was 4.9 with a standard deviation of 3.1 years. Of the participants, 19 were male.

A second set of data was collected on a sample of 51 full time business students. The students, 20 of whom were male, were an average of seven years younger than the manager sample and generally had no full time professional work experience.

### Procedure

Participants rated the extent to which they would consider each of 48 hypothetical candidates for promotion to fill a management vacancy in a large commercial bank. The simulation involved six pages of background material on the organization's structure, promotion policies, managerial potential ratings, equal employment opportunity guidelines, and instructions to fill a position vacancy. After reviewing the background material and the profiles of 48 candidates, the participants indicated the extent to which they would consider each candidate for promotion to a third level management position supervising branch managers. Evaluations were made on a 5-point scale ranging from 0 = "will not consider" to 4 = "most seriously consider."

### Experimental Design

Five attributes of each candidate were manipulated as part of a $2 \times 2 \times 3 \times 2 \times 2$ randomized block factorial design: candidate's managerial potential rating, recommendation, position relative to the vacancy, candidate weakness, and candidate sex. The use of a balanced factorial design created zero correlations among the five criteria and thereby simplified the comparison of statistical and subjective weights (Schmitt & Levine, 1977).

*Managerial Potential Ratings*—The background material defined managerial potential as "the quality of the process used to achieve high performance" based on a set of skills described in detail. The managerial potential scale ranged from 1 = "little or no potential" to 5 = "a great deal of potential." To avoid the obvious effect of candidates rated low in potential not being promoted, only the top two points of the potential scale were manipulated such that half the candidates had "good potential" and the other half had "a great deal of potential." Indices of managerial potential similar to the one used in this research have been applied in several organizations (Finkle, 1976; Kraut, 1972; Rosen, Billings, & Turney, 1976). Potential ratings were used rather than performance ratings in order to provide a more relevant index of future managerial behavior. All candidates were stated to have superior job performance records; no other information on past job performance was provided.

*Recommendation*—Political influence often is exerted in promotion decisions (Kanter, 1977; Kothari, 1974; Roche, 1979). In order to simulate the political influence of other organizational members on the subject's decision process, half the candidates were identified as "interesting" by the subject's immediate superior in the organization. A moderate manipulation was used to avoid the trivial finding that people would promote one whom their superior told them to promote.

*Position*—Research on promotion decisions suggests the importance of past experience, job knowledge, and one's closeness to the position opening as criteria for promotion (Campbell et al., 1970; Rosen et al., 1976). Candidates who work in the unit experiencing the position vacancy generally would have the most knowledge about the vacant position and current organizational context. Candidates performing different functions in different units would have the least amount of relevant job knowledge. Candidates in parallel units performing similar work to the unit experiencing the vacancy would have an intermediate level of job knowledge vis-à-vis the position vacancy. Hence, three positions were used: branch managers in the district with the vacancy (high job knowledge), branch managers in other districts (moderate job knowledge), and other bank officers at the branch manager level who worked in different functional areas and different units such as commercial banking or bank operations (low job knowledge).

*Candidate Weakness*—Although all candidates had exceptional performance ratings, each candidate had one area that needed improvement drawn from four skills described in the background material as important to managerial performance. The skills were behavior flexibility, impact on others, organization and planning, and written communications. The former two skills were used interchangeably as interpersonal skill weaknesses, the latter as administrative skill weaknesses. Half the candidates had an interpersonal skill weakness.

*Candidate Sex*—Substantial research and the existing disproportionate number of female managers in large organizations suggest that one's sex may affect one's chances of being promoted (Bigoness, 1976; Deaux & Taynor, 1973; Quinn, Tabor, & Gordon, 1968; Rosen & Jerdee, 1973; Shaw, 1972). In order to test this hypothesis, half the candidates were female.

*Situational and Individual Differences*—Promotion decisions are not as systematic or routine as are selection decisions (London, 1978). Management position vacancies occur relatively infrequently, and it is likely that each vacancy has unique situational features. In order to test the effect of situational variance on the weighting of promotion criteria, the vacancy was defined in one of two contexts for each subject. The control condition made no special mention of specific strengths that may be germane to filling the position. The experimental condition indicated that interpersonal skills were particularly necessary because the demands of the diverse clientele "require that the individual you promote be flexible and be able to get along well with different types of people." Subjects were randomly assigned to the experimental and control condition.

It also was possible to investigate rater sex differences as main effects and as interaction effects with other variables. However, previous research has not found the sex of the rater to be a salient factor in evaluating others (Hamner, Kim, Baird, & Bigoness, 1974; Rosen & Jerdee, 1973).

### Analyses

*Policy Capturing*—An analysis of variance was computed for the $2 \times 2 \times 3 \times 2 \times 2$ randomized block factorial design for each subject in order to index the 5 main effects and 26 interaction terms (Kirk, 1968). The analysis of data in a policy capturing study treats each decision maker's choices as a separate data set. Analyses are conducted such that the sample size for each decision maker is the number of decisions made (e.g., $N=48$ for each subject in this research). The regression beta weights or ANOVA effect sizes for each decision maker can then be compared, clustered, averaged, or treated in other ways as new data (Anderson, 1969; Hoffman, Slovic, & Rorer, 1968; Slovic, 1969). More detailed descriptions of policy capturing methodologies are provided by Schmitt and Levine (1977), Slovic and Lichtenstein (1971), and Zedeck and Kafry (1977). For a more detailed comparison of regression and ANOVA techniques, see Cohen and Cohen (1975).

This procedure partitioned all the variance generated by each subject into 31 parts. The interactions that did not account for an average of more than 3.3 percent of the total variance were considered trivial and ignored. (The 19 interaction terms omitted from further analysis are available from the senior author. It should be noted that no statistical analyses were conducted that treated these small interactions as an error term. Only the size of various effects are reported in Tables 1, 2, and 3, not whether these effects are significantly different from zero.) The 3.3 percent level was selected because each of the 31 effects would be expected to account for 3.3 percent of the total variance by chance. The proportion of total variance attributable to each main and interaction effect was determined by dividing the effect sum of squares by the total sum of squares. This index of effect size is referred to as eta$^2$ and is analogous to a squared correlation (Cohen & Cohen, 1975). Further, eta is comparable to regression beta weights when the regressors are independent of each other, as was the case in this research (Zedeck & Kafry, 1977; Feldman & Arnold, 1978).

*Situational Differences and Clustering*—An analysis of variance was conducted for each subject and the resulting eta$^2$s were averaged for comparison between experimental and control groups for each sample separately. Next, subjects were grouped into clusters of similar rater policies on the basis of a visual scan of the effect sizes. No effort was made to form different cluster sets within experimental and control groups. Six clusters of similar policies were independently formed by two independent judges with 93 percent agreement on policy categories.

Subjects were then coded according to the cluster in which they were placed. A multiple discriminant analysis (MDA) was performed to confirm each subject's placement in a cluster. The MDA confirmed the placement of 93 percent of the managerial sample and 98 percent of the student sample. Three managers and one student were reclassified to yield 100 percent correct classification in a subsequent MDA. The strong confirmatory MDA results suggest that other clustering techniques would yield similar results (Naylor & Wherry, 1965).

*Rater Sex Analysis*—A split-plot ANOVA design was used to investigate differences attributable to rater sex with all participants investigated simultaneously.

## RESULTS

### Policy Capturing

Table 1 indicates the average within-subject percent of variance accounted for by each criterion element for both experimental and control conditions in the manager and student samples. The effects shown include five ANOVA main effects and two large interactions (potential by recommendation and potential by recommendation by weakness). Interactions that accounted for less than 3.3 percent of criterion variance averaged across subjects were omitted from further analysis.

Three of the main effects for the manager and student samples accounted for substantial variance in both the experimental and control conditions: potential, position, and weakness. Candidate sex was not a criterion for promotion consideration in either condition or sample.

Two interactions were substantial and important for many of the raters in both conditions and samples. The contingency relationship of having

## TABLE 1
## Average Within-Subject Relative Weights for Criterion Elements and Salient Interactions for Experimental and Control Conditions[a]

| *Variable* | *Managers* | | | *Students* | | |
|---|---|---|---|---|---|---|
| | *Experimental (N=21)* | *Control (N=22)* | *t* | *Experimental (N=25)* | *Control (N=26)* | *t* |
| Potential | 18.6 | 19.7 | −.15 | 15.5 | 24.2 | −1.75* |
| Recommendation | 6.4 | 1.2 | 2.12** | 5.1 | 4.9 | .11 |
| Position | 5.2 | 8.9 | −.92 | 7.0 | 6.5 | .15 |
| Weakness | 17.5 | 12.0 | .92 | 22.9 | 14.6 | 1.31 |
| Candidate sex | .4 | .2 | .79 | .4 | .7 | −1.19 |
| Potential by recommendation | 11.1 | 18.4 | −1.66* | 10.8 | 11.7 | −.21 |
| Potential by recommendation by weakness | 8.7 | 7.5 | .45 | 6.6 | 9.0 | −.69 |
| Total | 68.0 | 67.8 | .04 | 68.7 | 71.5 | −.58 |

[a] Interactions that accounted for an average of less than 3.3 percent of outcome variance are not shown. Weights are percents of outcome variance accounted for by each element. The *t*-test is a test for the significance of the difference between the experimental and control groups.

*$p \leq .10$ (two-tailed)

**$p \leq .05$ (two-tailed)

both high potential and superior support accounted for 11.1 percent of the variance in the experimental condition and 18.4 percent in the control condition for managers; 10.8 percent and 11.7 percent, respectively, for students. The three-way interaction of potential by recommendation by weakness was moderately important in the experimental and control conditions (8.7 percent and 7.5 percent, respectively, for managers and 6.6 and 9.0 percent for students). The two interactions explained approximately one-third of the accounted for variance. Apparently many of the raters developed and applied contingencies as part of their promotion policies. Overall, the same six effects (excluding candidate sex) accounted for approximately 70 percent of the variance in each condition and for each sample.

The manipulation of the situational context had some effect on rater policies. In the experimental condition the decision context specified the need for the individual promoted to have strong interpersonal skills. Hence, the weakness variable was hypothesized to be a more important factor. The test of significance used was a *t*-test for a difference between the mean variance accounted for by each variable in the experimental and control conditions.

Weakness was weighted more heavily (although not significantly so) in the experimental condition for both samples (17.5 percent versus 12.1 percent for managers; 22.9 percent versus 14.6 percent for students) indicating that criterion weights may vary as a function of the situation. The average effect for the weakness variable across the two samples was significant ($p \leq .05$). The superior's recommendation was weighted significantly more heavily in the experimental condition (6.4 percent) than in the control condition (1.2 percent) for managers ($p \leq .05$). The effects were nearly equal for students (approximately 5 percent). The potential rating was less important in the experimental condition for students ($p \leq .10$). The potential by recommendation interaction was weaker in the experimental condition (11.7 percent) than in the control condition (18.4 percent, $p \leq .10$) for the managerial sample, perhaps because the experimental condition may have focused the subject's attention on individual variables restricting the perception of interactions among criteria.

## Policy Clusters

Inspection of individual weights suggested that several distinct policies existed. Six clusters of policies were identified based on single attributes, multiple attributes, or interactions for the manager sample, and the policies were replicated in the student sample. The mean weights for each cluster are summarized in Table 2 (managers) and Table 3 (students).

### TABLE 2
### Cluster Mean Weights for Criterion Elements and Interactions for Managers[a]

| | *Clusters* | | | | | |
|---|---|---|---|---|---|---|
| *Criterion Elements* | *A* | *B* | *C* | *D* | *E* | *F* |
| Potential | *50.4* | 3.7 | 6.2 | 6.7 | 5.3 | *12.4* |
| Recommendation | .4 | 5.0 | 2.0 | .6 | 1.0 | *15.3* |
| Position | 2.5 | *35.3* | 1.2 | 6.9 | .2 | 1.1 |
| Weakness | 2.8 | 4.8 | *60.0* | 8.7 | 16.5 | *15.6* |
| Candidate sex | .5 | .0 | .0 | .6 | .0 | .3 |
| Potential × recommendation | 3.8 | 7.8 | 11.8 | *37.6* | *24.8* | *10.6* |
| Potential × recommendation × weakness | 5.8 | 3.7 | 5.2 | 4.7 | *24.7* | 7.0 |
| Total | 66.2 | 60.3 | 86.4 | 65.8 | 72.5 | 62.3 |
| *N* | 12 | 6 | 5 | 7 | 6 | 7 |

[a]Italicized numbers identify the variables used to form clusters. The weights shown are the average within-subject percent of accounted for variance of the promotion consideration ratings.

### TABLE 3
### Cluster Mean Weights for Criterion Elements and Interactions for Students[a]

| | *Clusters* | | | | | |
|---|---|---|---|---|---|---|
| *Criterion Elements* | *A* | *B* | *C* | *D* | *E* | *F* |
| Potential | *45.8* | 6.0 | 10.0 | 8.7 | 8.5 | *20.4* |
| Recommendation | 4.3 | 2.8 | 2.8 | 1.1 | .5 | *13.3* |
| Position | 3.9 | *38.2* | 1.6 | 3.4 | .8 | 5.5 |
| Weakness | 9.3 | 9.0 | *52.0* | 2.1 | 19.3 | *7.4* |
| Candidate sex | .6 | .6 | .3 | .9 | .5 | .6 |
| Potential × recommendation | 6.8 | 2.6 | 4.9 | *37.4* | *16.8* | *8.4* |
| Potential × recommendation × weakness | 2.3 | 1.2 | 4.4 | 2.7 | *42.0* | 11.3 |
| Total | 73.0 | 60.4 | 76.0 | 56.3 | 88.4 | 66.9 |
| *N* | 12 | 5 | 12 | 7 | 4 | 11 |

[a]Italicized numbers identify the variables used to form clusters. The weights shown are the average within-subject percent of accounted for variance of the promotion consideration ratings.

Cluster A raters weighted a candidate's potential most heavily, largely to the exclusion of other factors; cluster B raters focused on a candidate's position; cluster C raters focused on a candidate's weakness.

In contrast to the raters in clusters A, B, and C who had one salient criterion, many raters employed policies involving multiple criteria and/or configural relationships. The cluster D policy involved the potential by recommendation interaction. Both potential and the recommendation were important criteria; however, neither was important alone. Cluster E policies included both interactions. Apparently these raters developed fairly sophisticated decision rules that involved tradeoffs among several pieces of information. The moderate weights for three main effects and the potential by recommendation interaction for cluster F indicated another type of complex policy. These individuals appear to have used a combination of policies, including elements of the policies used by raters in clusters A, B, C, and D. The interpretations of different cluster policies are tentative. The raters' cognitive processes were not directly investigated. However, individual differences in the relative weighting of various criteria are apparent. The strong similarity in clusters between managers and students suggests the stability of the clusters.

In order to determine the significance and strength of the cluster differences for each criterion element, separate between-cluster ANOVAs were computed for potential, recommendation, position, weakness, candidate sex, potential by recommendation, potential by recommendation by weakness, experimental-control, and total accounted for variance separately for managers and students. These results are summarized in Table 4. Strong and significant differences occurred for each criterion element except candidate sex, experimental-control, and the total variance accounted for across clusters. Clusters were highly differentiatable by criteria. Cluster differences accounted for over 57 percent of criterion element

**TABLE 4**

**Between Cluster ANOVAs of Criterion Elements, Interactions, and Experimental-Control Condition for Managers and Students**[a]

| | *Managers* | | *Students* | |
|---|---|---|---|---|
| *Dependent Variable* | *F* | *Eta²* | *F* | *Eta²* |
| Potential | 24.3** | .77 | 23.5** | .72 |
| Recommendation | 5.2** | .41 | 5.1** | .36 |
| Position | 33.2** | .82 | 35.8** | .80 |
| Weakness | 31.4** | .81 | 20.1** | .70 |
| Candidate sex | .7 | .09 | .5 | .05 |
| Potential by recommendation | 16.3** | .69 | 16.5** | .65 |
| Potential by recommendation by weakness | 9.6** | .57 | 32.1** | .78 |
| Experimental-control | 1.3 | .15 | .6 | .06 |
| Total accounted for variance | 3.4* | .32 | 3.0 | .25 |

[a] Each of the nine one-way ANOVAs conducted treated the criterion element as the dependent variable and the cluster as the independent variable.

*$p \leq .01$

**$p \leq .001$

variance for five of the nine criterion elements, and over 70 percent for three criterion elements.

### Agreement of Statistical and Subjective Weights

After rating the 48 candidates, subjects in the management sample ranked the five main effect criteria in terms of their importance in making the ratings. The mean Spearman rank order correlation between these ranks and the empirically derived weights for the main effects was .67. This correlation may be restricted. Many subjects considered configural relationships in ranking the importance of the criteria. To account for this in the objective weights, the weights derived from the two interactions that contributed meaningful variance were divided by the number of variables in the interaction and apportioned to each component of the interaction. For example, the proportion of variance due to the potential by recommendation interaction was divided by 2, and the result was added to the proportion of variance due to the main effects for potential and recommendation. The Spearman correlation between the "adjusted" statistical weights and the importance ranks across all clusters was .74, indicating some increase in agreement. The difference between the Spearman correlations involving the adjusted and unadjusted weights was largest for raters in cluster D who relied heavily on the potential by recommendation interaction. The mean Spearman correlation before adjustment for cluster D was .46; after adjustment it was .70.

### Rater Sex by Rater Policy

A split-plot ANOVA was computed to determine whether male and female managers employed similar policies. Only 1 of the 31 effects was significantly different at the .05 level. Female raters tended to place more emphasis on the superior's recommendations than did males ($F=4.2$, df$=1, 41$). The failure to observe sex of rater differences in rating policies was consistent with previous research (Hamner et al., 1974; Rosen & Jerdee, 1973).

## DISCUSSION

The present study was concerned with how decision makers utilize criterion information about job candidates for promotion to a third level managerial position. The results generally support previous policy capturing research (Slovic & Lichtenstein, 1971; Slovic et al., 1977). However, several findings related to nonlinear composite criteria models, clusters of rater policies, and the similarity of statistical and subjective criterion weights extend previous findings.

Of the five variables manipulated in this study, four had substantial weights when averaged across the 43 managers and 51 students to account for an average of 48 percent of the decision choice variance. The addition of two contingency relationships increased the average accounted for variance to approximately 70 percent. Thus, simple linear models may not efficiently describe all rater policies. The presence of large interactions indicates that configural or multiplicative models are applied by some individuals.

Simple linear models seem to capture most of the variance in decisions when many criteria are used by the decision makers (Feldman & Arnold, 1978; Zedeck & Kafry, 1977). The smaller number of salient criteria employed in this research, compared to other policy capturing studies, may have contributed to the strong configural relationships observed. As the number of relevant criteria is reduced (to four in this research), contingency relationships may no longer strain the information processing capacities of the decision maker (Newell & Simon, 1972; Slovic & MacPhillamy, 1974; Wright, 1974), and interactions may be more likely (Slovic et al., 1977). Field studies are necessary to determine whether the abundance of information available to decision makers is used in a linear fashion, as suggested by much of the previous research, or whether information is substantially screened and the number of alternatives reduced to only a few, which would then permit nonlinear information processes (Payne, 1976).

The criteria weights for four variance components—potential, recommendation, weakness, and potential by recommendation—varied across the 94 participants as a function of the sample and/or situation. However, these differences were only moderate in size. If an organization decides to use statistical weights in its selection, salary, and promotion decisions, it should recognize that appropriate weights may vary somewhat depending on the situation. Whether this variance is substantial enough to require separate validation of weights in different situations is a matter for future study.

### Capturing Rater Policy Differences

Six clusters of rater policies were identified. Three clusters were based on the salience of a single attribute in predicting the rater's choices: managerial potential ratings, position, and candidate weakness. Many of the participants held strong views regarding the single attribute most important for promotion. It should be recognized that the nature of the simulation may have placed unrealistic demands on the participants (i.e., evaluate 48 candidates), and the experimental manipulation of the criteria may have been too artificial for the results to generalize to other settings. Simplistic decision rules may have been an experimental artifact. Future research should investigate policy capturing with tasks that have a practical number of alternatives in field settings.

Three clusters were based on the salience of contingency relationships and/or multiple criteria. Not only are individuals likely to employ nonlinear information synthesizing methods, but the same methods may be applied by several decision makers. Individual difference variables that might account for these different rater policies cannot be determined from this research. The only individual difference variable available to the researchers was participant sex—which was unrelated to rater policy. However, future research should investigate individual attributes that could account for policy differences. Several variables suggested by previous research are cognitive complexity, risk taking tendency, and motivation to perform the task (Ebert & Mitchell, 1975; Lang, Dittrich, & White, 1978).

### Accuracy of Criterion Weights

Several studies have found moderate differences between statistical weights and subjective weights (Feldman & Arnold, 1978; Hoepfl & Huber, 1970; Slovic, Fleissner, & Bauman, 1972; Zedeck & Kafry, 1977). The similarity of statistical and subjective weights has been suggested as an index of self-insight. Slovic and Lichtenstein (1971) and Zedeck and Kafry (1977) provide a rationale for less than perfect self-insight based on theoretical as well as experimental artifact explanations. This research extends their analysis with an additional explanation: Some individuals employ criteria in configural ways that are not effectively reflected in statistical weights based on main effects but that may be part of self-reported subjective weights. Research focusing on predecisional processes as suggested by Payne et al. (1978) is necessary in order to substantiate such an explanation. However, the modest improvement in agreement between "adjusted" statistical weights and subjective weights in this research, and other research that has observed nonlinear information synthesizing processes (Nystedt & Murphy, 1979; Payne, 1976; Tversky, 1969, 1972) support the explanation.

### Policy for Promotion Decisions

Managerial promotion decisions were investigated in order to understand further how such decisions are made, which criteria are perceived as most important, and which interactions are salient. Contrary to expectations, single criteria explained most of the decision variance for three clusters of raters. Such differences in rater policies are masked when managerial promotions are studied across decision makers and in cross-sectional field studies (Kothari, 1974; Quinn et al., 1968; Pedigo & Meyer, 1979; Rosen et al., 1976). The average weights for the 43 managers and 51 students suggest substantial variance in the importance of criteria across decision makers. A particular candidate with one set of attributes would be evaluated very differently by different decision makers. This suggests that substantial training and clear promotion policies are necessary if all decision makers are to weight the criteria for promotions similarly.

The two significant interactions are consistent with the qualitative literature on the attributes necessary for one to be promoted (Kanter, 1977;

Roche, 1979). Having high managerial potential coupled with support at higher levels *and* no outstanding weaknesses should increase the amount of consideration a candidate is given for promotion. Yet, less than half of the participants applied such a contingency relationship in their decision making, suggesting the need to specify clearly the criteria for management promotions.

The generalizability of this study is limited due to the experimental nature of the task and the populations sampled. However, a pilot study by the authors supports the generalizability of this study. A promotion decision in-basket was designed to provide operating managers in three companies of a large organization with the data they would normally have when making a promotion decision. The half-day simulation was completed by 72 managers. The most important criteria for promotion were managerial potential ratings and weaknesses; candidate sex accounted for near zero variance. These experimental data also parallel survey data reported by 250 managers in other companies within the same parent organization (Pedigo & Meyer, 1979).

Future research on promotion decisions is necessary in other organizations using realistic simulation and policy capturing techniques. Such research should help determine the extent to which configural policies are used, rater policies can be clustered, and subjective weights agree with statistical weights.

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# Goal Setting and Performance Evaluation: An Attributional Analysis

**DENNIS L. DOSSETT**
**CARL I. GREENBERG**
**University of Nebraska at Omaha**

*The present study considered the effect of goal setting on supervisors' evaluations of employees' performance and the causes attributed to that performance. Results indicated that attributional distortions were greater in the assigned than in the participative or self-set goal conditions. Supervisors rated the high participatively-set goal worker significantly higher in performance, ability, effort, and goal commitment than they rated the low participatively-set goal worker.*

Performance appraisal rating errors have been given considerable attention in the literature. The thrust of most of this research has centered around the psychometric properties of the rating scales (Landy & Farr, 1980) and on the reduction of rater errors through training (Latham, Wexley, & Pursell, 1975). Of probably equal importance in committing rating errors are the social and situational information cues available to the evaluator. To date such cues have been largely ignored in the industrial psychology and management literature (Landy & Farr, 1980).

Social psychologists, however, have been pursuing these informational cues for some time (Kelley, 1967). Specifically, Weiner, Frieze, Kukla, Reed, Rest, and Rosenbaum (1971) propose that attributions regarding task success and failure affect the degree to which an observer attributes task performance to internal or external causes. According to these authors, internal attributions are the actor's effort and ability; external attributions are task difficulty and luck. For example, Mitchell and Wood (1980) found that when the consequences of poor performance were major, supervisors made more internal causal attributions for that performance. In addition, Garland and Price (1977) have shown that the success of female managers was attributed by prejudiced male managers to luck and an easy task, but unprejudiced male managers attributed the success of their female counterparts to skill and hard work.

A highly salient set of information cues is provided to the evaluator not only by the outcome of success or failure, but also by the standards by which the employee's performance is judged and the method by which those standards are established. The latter may be accomplished through engineered work standards, a supervisor either assigning a work goal to the employee or setting the goal participatively, or even by allowing for self-set work goals. Thus, an interesting line of research would focus on the attributions made during performance evaluation as a function of various goal setting methods under conditions of task success or failure. That is, if performance evaluations made by a supervisor are subject to attributional distortion, is the nature of such distortions dependent on goal attainment? In addition, are the dynamics of different methods of goal setting an appreciable factor in the final evaluation of performance?

To date, no research has systematically investigated the effects of process variables on performance appraisal in the context of goal setting. It seems reasonable that a supervisor's evaluation of an employee's performance may be affected by information obtained during the goal setting process. In considering this process, a supervisor has considerable information that may be more or less salient when evaluating an employee's performance.

One important informational cue is the question of who set the goal. The degree of influence a supervisor has in setting a goal increases from self-set, through participative, to assigned goal setting procedures. As a supervisor's influence increases in setting the goal, the employee's task performance becomes more "hedonically relevant" to the supervisor (Jones & Davis, 1965). That is, the success or failure of the employee in meeting the goal has positive or negative consequences for the supervisor. Consequently, a supervisor may differentially distort an employee's performance evaluation as a function of the type of goal setting process, especially if the employee failed to meet the goal. Such failure may be a threat to the supervisor's self-esteem, the supervisor then making a defensive attribution to avoid that threat (Jones & Davis, 1965). It therefore *was hypothesized that an employee's performance evaluation would be affected by an interaction between his performance outcome and the manner in which the goal was set*. Specifically, it was expected that supervisors would distort the causal attributions of performance and, hence, the performance evaluation for a failing employee more in an assigned goal setting condition than in either participative or self-set conditions. No significant distortions were anticipated for successful employees.

A second piece of information that may affect a supervisor's evaluation of an employee's performance is the difficulty of the goal to which an employee initially aspires relative to the agreed-upon goal when the goal is participatively set. For example, a supervisor who is faced with an employee who initially suggests a very difficult goal is likely to draw different inferences regarding the causal factors of the employee's performance than when faced with an employee who initially suggests a relatively easy goal. Furthermore, the initial goal suggested by an employee may ultimately affect his performance rating given by his supervisor. Thus, in the present study two types of participative goal setting conditions were developed. The employee either initially suggested a more difficult or less difficult goal relative to the final agreed-upon goal. It was predicted that an employee suggesting a relatively hard goal would be perceived as being a better worker with higher ability, goal commitment, and motivation to perform the task than an employee suggesting a relatively easy goal. The employee's initially suggested goal was expected to affect differentially the supervisor's attributions for success or failure and thus the overall performance evaluation, because the participative goal setting conditions were hedonically relevant to the supervisor.

A final, and probably the most potent, determinant of a supervisor's evaluation of an employee's performance is whether or not the employee meets the performance goal. In the present study, half the supervisors saw a worker succeed by exceeding the set goal. Successful goal attainment was hypothesized to affect significantly supervisor's attributions for the causes of the worker's performance and their subsequent overall performance evaluation rating.

The present study was designed to ascertain the effects of different types of goal setting procedures on a worker's performance evaluation and the perceived causes of that performance. Subjects were shown one of several videotapes of a supervisor and a worker setting a performance goal. After receiving information about the worker's success or failure in meeting the goal, the subjects assumed the role of the supervisor and evaluated the worker's performance. Attribution research has demonstrated that role players make the same attributions as those of actual participants (Bem, 1972). Thus, role players participated in one of three goal setting conditions: participative, assigned, or self-set. The participative goal setting condition was divided further into two conditions in which the worker suggested either a relatively hard or easy goal as compared to the final goal set. Each of these conditions was combined with the worker either succeeding or failing to meet the goal set. Sex of the subjects was treated as a blocking variable.

## METHOD

### Subjects

The participants were 30 male and 50 female undergraduates attending the University of Nebraska at Omaha. In exchange for their participation in the experiment, subjects received extra credit in their respective courses. There were 10 subjects in each of the 8 experimental conditions. However, the proportion of males to females in each condition varied considerably.

## Procedure

Subjects were shown two videotaped sequences of a male worker. The first tape (goal setting) involved the worker and his (male) supervisor discussing how the task should be done and setting a production goal for the worker. Videotape, rather than a live supervisor-worker interaction, was used to control goal difficulty and any unique "historical" factors that could bias the results. Following this tape, the subjects completed a questionnaire assessing their impressions of the worker, the supervisor, and the discussion between them.

The second videotape (work performance) was a five minute sequence of the worker performing the task. The task involved collating five order sheets in a specified random order and adding up numbers obtained from the five sheets. This task was adapted from a similar collating task used by Heller, Groff, and Solomon (1977). After subjects viewed this tape they again completed a questionnaire, this time playing the role of the supervisor. The subjects were given instructions that the questionnaire was a performance evaluation for appraising the performance of the worker they had just viewed. When the subjects had completed this questionnaire they were debriefed and dismissed.

## Goal Setting Manipulation

Four versions of the goal setting videotape were produced. All tapes were identical except for the part pertaining to setting the goal. In one tape the worker set his own goal, and in another the supervisor assigned the goal to the worker. The two participation tapes differed only on the goal initially suggested by the worker. In one tape (high-goal worker) the worker initially suggested a goal of 70 completed orders per hour. In the other tape (low-goal worker), the goal initially suggested was 50 correctly completed orders per hour. In each of these tapes the supervisor responded by suggesting 50 or 70 completed orders per hour, respectively. The final goal was set at 60 orders per hour in both conditions.

For example, in the high-goal worker condition the interaction proceeded as follows:

Supervisor: "How many orders per hour do you think you can correctly process?"
Worker: "I think I can do about 70 per hour."
Supervisor: "Well, I think that may be a little high. How do you feel about a goal of 50?"
Worker: "Well, maybe so. Would 60 an hour be O.K.?"
Supervisor: "That sounds fine! That shouldn't be too difficult; most of our people make their production goals pretty regularly. . . ."

The remaining two tapes constituted the assigned and self-set goal setting conditions. In the assigned goal setting condition the supervisor told the worker, "I expect you to correctly complete 60 orders per hour. That shouldn't be too difficult; most of our people make their production goals pretty regularly. . . ." In the self-set goal setting condition the supervisor asked the worker how many orders he thought he could correctly process. The worker responded by stating, "I think I can do about 60 per hour."

### Performance Outcome Manipulation

The worker's performance outcome was manipulated in a written statement on the performance evaluation questionnaire. In the failure conditions subjects were told that the worker completed only 53 orders out of a goal of 60. In the success conditions the worker completed 67 orders per hour.

### Dependent Variables

Two separate sets of dependent measures were assessed after the goal setting and work performance videotapes, respectively, were shown to the subjects. Following the goal setting tape subjects were asked to rate the following items on a 7-point scale: (a) "Compared to the supervisor, how much influence did the worker have in setting the goal?" (*none—extreme amount*); (b) "How committed do you think the worker is to attaining his goal?" (*very uncommitted—very committed*); (c) "How difficult do you think it will be for the worker to achieve his goal?" (*very easy—very difficult*).

After all subjects were shown the same work performance videotape and told whether the worker had succeeded or failed to meet the set goal, they assumed the role of the supervisor and rated the worker on a series of 7-point scales. These included the extent to which: (a) the worker was committed to meeting the goal (*very uncommitted—very committed*); (b) his performance was due to luck (*bad luck—good luck*); (c) his performance was due to his ability (*lack of ability—high ability*); (d) his performance was due to goal difficulty (*hard goal—easy goal*); (e) his performance was due to his effort (*lack of effort—high effort*); and (f) a rating of his overall performance (*very poor—excellent*).

## RESULTS

Although the experiment was a $4 \times 2 \times 2$ factorial design, for clarification the data were analyzed by two separate factorials. In order to assess the effects of the goal setting and performance outcome manipulations on the dependent variables, the two participative goal setting conditions were combined to yield a 3 (self-set/participative/assigned) × 2 (success/failure) × 2 (female/male) factorial design. The effects of interaction process during the participative goal setting conditions and of the performance outcomes on the dependent variables were assessed in a 2 (high goal worker/

low goal worker) × 2 (success/failure) × 2 (female/male) factorial design. The results for the 3 × 2 × 2 factorial analysis across assigned, self-set, and the combined participative goal setting conditions will be presented first (analysis 1), followed by the 2 × 2 × 2 factorial analysis within the participative conditions (analysis 2). These factorial designs were analyzed via an unweighted means analysis of variance.

### Analysis 1

*Goal Setting Effects*—The three goal setting conditions may be conceptualized as lying on a continuum measuring the extent to which the worker had influence in setting the goal. Conceptually, workers who set their own goals should have the most influence, followed by participative and assigned goal setting conditions, respectively. The data supported this assertion. Goal setting conditions significantly affected subjects' ratings of the worker's influence in setting the goal, $F(2, 77) = 12.69$, $p < .01$. The worker was rated as having slightly more, although not significantly more, influence in the self-set goal setting condition ($M = 4.75$) than in the participative goal setting condition ($M = 4.18$). However, the worker was rated as having significantly less influence in the assigned goal setting condition ($M = 2.25$) than either the self-set, $t(38) = 4.35$, $p < .001$, or participative goal setting conditions, $t(58) = 4.55$, $p < .01$. No significant main effects on the other dependent measures were found for goal setting.

*Performance Outcome Effects*—As predicted, success or failure in meeting the goal affected subjects' ratings of the worker on a number of dependent measures. Table 1, summarizing the results, shows that the successful worker's performance was attributed significantly more to good luck, an easy goal, high effort, and high ability than was the unsuccessful worker's performance. Similarly, the successful worker was rated higher in his overall performance and goal commitment than was the failing worker.

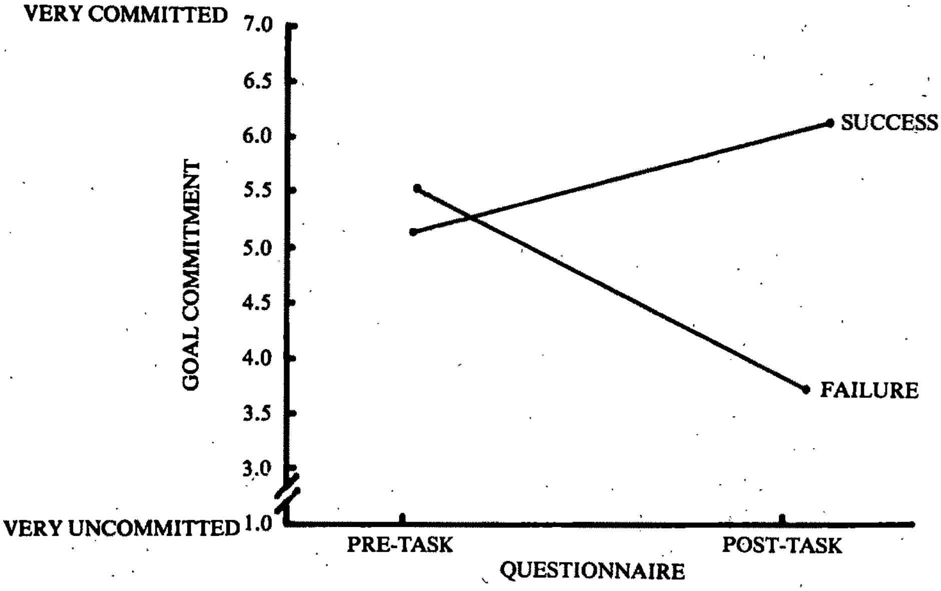
The worker's goal commitment was measured before and after the performance manipulation. Thus a repeated measures analysis of variance

**TABLE 1**
**Summary of Results for Success and Failure Conditions**

| *Dependent Variable* | *Success Mean* | *Failure Mean* | *DF* | *F* |
|---|---|---|---|---|
| Bad luck—good luck | 4.65 | 3.91 | 1, 55 | 10.92** |
| Hard goal—easy goal | 4.74 | 3.91 | 1, 58 | 4.31* |
| Lack of effort—high effort | 5.80 | 3.50 | 1, 61 | 47.14*** |
| Lack of ability—high ability | 5.36 | 4.52 | 1, 57 | 7.84** |
| Performance rating | 5.40 | 3.73 | 1, 68 | 38.15*** |
| Post-task goal commitment | 6.07 | 3.77 | 1, 68 | 66.16*** |

*$p < .05$
**$p < .01$
***$p < .001$

FIGURE 1
Pre- and Post-Task Goal Commitment
as a Function of Performance Outcome

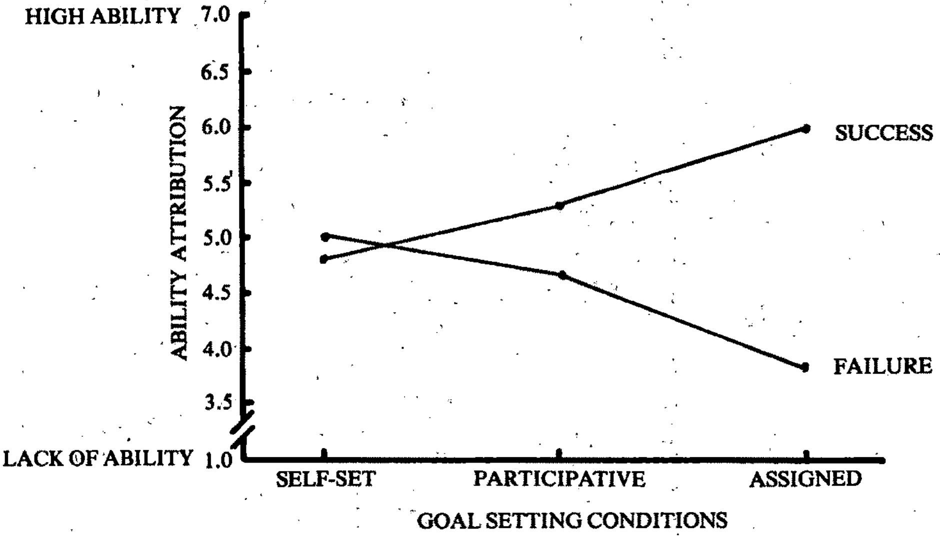


was performed on this variable. Figure 1 demonstrates that success or failure in meeting the goal significantly affected subjects' evaluation of the worker's goal commitment, $F(1, 74) = 22.26$, $p < .001$. There was no significant difference before the manipulation. However, post-task goal commitment was rated significantly different between success and failure conditions, $t(78) = 7.80$, $p < .001$. The data also show that in the success condition, post-task goal commitment increased significantly from the pre-task measure, $t(78) = 3.16$, $p < .01$, and in the failure condition post-task goal commitment decreased significantly, $t(78) = 5.59$, $p < .001$.

*Goal Setting × Performance Interaction Effects*—It was predicted that the attributional measures would be significantly affected by the interactions of goal setting and performance outcome conditions. This hypothesis was partially supported for subjects' attributions of the worker's ability, $F(2, 57) = 3.14$, $p < .05$. As shown in Figure 2, the only significant difference between success and failure was in the assigned goal setting condition, $t(15) = 5.04$, $p < .001$. Contrary to prediction, differences within the failure condition were not large enough to reach statistical significance. However, the difference between self-set and assigned goal setting conditions when the worker succeeded in meeting the goal was significant, $t(17) = 2.30$, $p < .05$.

Post-task commitment also was affected by the interaction of goal setting and performance, $F(2, 68) = 4.07$, $p < .05$. As predicted, the only significant decrease in goal commitment occurred within the failure

**FIGURE 2**
**Ability Attribution as a Function of Goal Setting Condition and Performance Outcome**



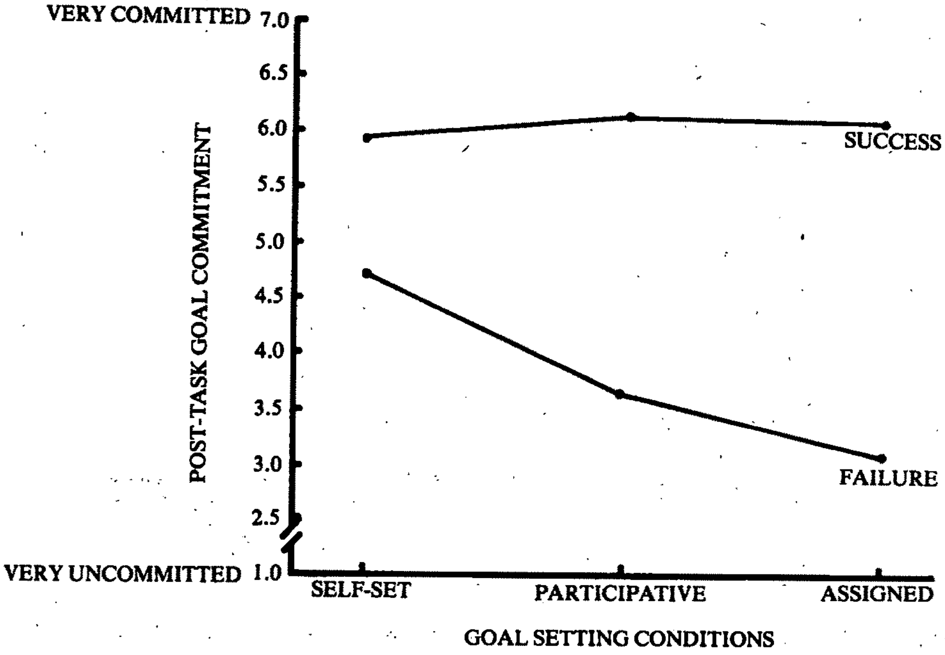
condition. This decrease was significant between self-set and assigned goal setting conditions, $t(8) = 2.57$, $p < .05$ and between participative and assigned goal setting conditions, $t(28) = 1.93$, $p < .001$. There were significant differences between success and failure conditions with participative goal setting, $t(38) = 5.62$, $p < .001$, and when the goal was assigned by the supervisor, $t(18) = 5.60$, $p < .001$.

*Sex Effects*—Significant sex effects were found for the post-task goal commitment attribution, $F(1, 68) = 4.05$, $p < .05$. Females ($M = 5.04$) rated the worker (male) significantly higher than did males ($M = 4.73$) on this variable. Parallel effects were found for the effort attribution, $F(1, 61) = 5.34$, $p < .05$, with females rating effort higher ($M = 4.76$) than males ($M = 4.33$). In effect, these two variables were measuring the same dimension, as they correlated .86 across the entire sample. Because of the marked disproportionality of males and females across cells, interaction effects were deemed unreliable and thus are not reported.

### Analysis 2

*Goal Setting Effects*—Prior to the performance outcome manipulation the data revealed a significant effect of the worker's initially suggested goal on the amount of influence he had in setting the goal, $F(1, 39) = 6.40$, $p < .02$. Subjects rated the worker who initially suggested a relatively high goal as having more influence ($M = 4.75$) than the worker who initially

FIGURE 3
Post-Task Goal Commitment Attribution as a Function of Goal Setting Condition and Performance Outcome



suggested a relatively low goal ($M = 3.60$). Similarly, the high-goal worker was seen as being more committed to the task ($M = 6.05$) than was the low-goal worker ($M = 4.45$), $F(1, 39) = 11.60$, $p < .002$.

Subsequent to the performance outcome manipulation, subjects attributed significantly higher goal commitment, effort, and ability to the high-goal worker as compared to the low-goal worker (Table 2). In addition, the high-goal worker was rated significantly higher on his performance evaluation than was the low-goal worker.

**TABLE 2**
**Summary of Results for Worker-High and Worker-Low Goal Conditions**

| *Dependent Variable* | *High Goal Mean* | *Low Goal Mean* | *DF* | *F* |
|---|---|---|---|---|
| Post-task goal commitment | 5.35 | 4.45 | 1, 32 | 3.67* |
| Lack of effort—high effort | 5.21 | 3.76 | 1, 28 | 5.15** |
| Lack of ability—high ability | 5.47 | 4.50 | 1, 27 | 3.54* |
| Performance rating | 5.15 | 4.00 | 1, 32 | 8.11*** |

*$p < .07$
**$p < .05$
***$p < .01$

TABLE 3
**Summary of Results for Success and Failure Conditions**

| *Dependent Variable* | *Success Mean* | *Failure Mean* | *DF* | *F* |
|---|---|---|---|---|
| Post-task goal commitment | 6.15 | 3.65 | 1, 32 | 45.18*** |
| Bad luck—good luck | 4.56 | 3.83 | 1, 26 | 7.67** |
| Hard goal—easy goal | 4.82 | 3.56 | 1, 27 | 5.43* |
| Lack of effort—high effort | 5.88 | 3.45 | 1, 28 | 33.96*** |
| Lack of ability—high ability | 5.35 | 4.61 | 1, 27 | 4.45* |
| Performance rating | 5.45 | 3.70 | 1, 32 | 25.07*** |

*$p<.05$
**$p<.01$
***$p<.001$

*Performance Outcome Effects*—Again, as in analysis 1, the success/failure manipulation had a significant effect on subjects' attributions of the worker's performance and his performance rating. Significant differences are noted in Table 3 for the dependent measures of goal commitment, luck, goal difficulty, effort, ability, and performance rating. No significant interactions were found between initial goal level and performance outcome for any dependent variable.

*Sex Effects*—Paralleling the results of analysis 1, females rated the worker's post-task goal commitment and effort significantly higher than did males, $F(1, 32) = 6.98$, $p < .01$, and $F(1, 28) = 9.28$, $p < .005$, respectively.

## DISCUSSION

### Performance Appraisal

This study failed to find any differential effect of goal setting and the worker's performance outcome on the overall performance evaluation. Consequently, the type of goal setting procedure used did not enter into the rating of the worker's performance, but only the perceived causes for performance. The overriding determinant of the worker's overall performance effectiveness was whether or not he was able to meet the set goal. In short, the type of goal setting procedure utilized in setting the goal apparently only comes into play when evaluators are assessing the causes of an employee's performance outcome rather than the employee's overall effectiveness.

The second set of data analyses revealed some equally important implications for supervisory performance appraisals and causal attribution ratings. The results supported the predictions that, within participative goal setting conditions, supervisor ratings and attributions regarding the worker's performance outcomes would be affected by the difficulty of the worker's initially suggested goal. Regardless of whether the worker succeeded or failed in meeting the agreed-upon goal, supervisors rated the worker who initially suggested a relatively high goal as performing better than the low-goal counterpart. Similarly, supervisors rated the high-goal worker as having higher goal commitment, effort, and ability than the low-goal worker. These data suggest that the content of the participative goal setting interaction between a supervisor and an employee may play a significant role in a supervisor's subsequent performance appraisal ratings. In this study the worker suggesting a relatively harder goal than the supervisor was willing to accept may have facilitated attributions of higher internal motivational and ability states even before information regarding his performance outcome was provided. Consequently, subjects taking the role of the supervisor may have been persuaded that "the worker must be a good worker or else why would he suggest such a difficult goal?" On the other hand, a worker initially suggesting a lower goal than the supervisor desired may have prompted the inference that "he must be a poor worker or why else would he suggest such an easy goal?" Thus, the worker's initial high-goal suggestion may have provided a positive halo effect for the supervisor when he/she evaluated the worker's performance. In short, the high-goal worker appears to have bluffed his way into an inflated performance rating and more positive causal attributions for his performance.

## Attributional Distortions

The prediction that performance attributions would be differentially affected by goal setting conditions and performance outcomes was supported for subjects' attributions of the worker's ability and goal commitment. Subjects playing the role of the worker's supervisor increased the disparity of their ratings for the ability attribution in success and failure conditions as their (the supervisors') influence in setting the goal increased. That is, when the worker set his own goal, ability attributions were almost identical in success and failure conditions. However, with increasingly more supervisory influence in setting the goal, as in the participative and assigned goal setting conditions, respectively, subjects tended to attribute higher ability to the successful worker and lower ability to the unsuccessful worker. This effect was especially noticeable in the assigned goal setting condition in which the supervisor was totally responsible for the goal level. Thus, as goal setting conditions increased in hedonic relevance for the supervisor from self-set through participative to assigned conditions, attributional distortions in ability became more pronounced.

One may wonder why ability was the only classical attribution measure affected in the present study, particularly as these attributions were generally highly correlated. However, careful analysis of the experimental situation shows that the attributional results of this study are consistent with attribution theory and research. Weiner et al. (1971) state that the causal attributions of ability, effort, task difficulty, and luck can be dichotomized on two dimensions. As previously stated, ability and effort are internal attributions; task difficulty and luck are external. In addition, ability and task difficulty are seen as stable, but effort and luck are unstable attributions. That is, over a series of trials the latter two causal attributions take on greater significance. However, in this study there was only one performance trial. Thus, there was insufficient information on which to base attributions to these unstable characteristics. On the other hand, ability and task difficulty are stable attributions, but task difficulty (goal difficulty) was held constant in this study. Thus, observers of performance could more readily attribute the cause of performance to ability than to any other factor (Jones, Rock, Shaver, Goethals, & Ward, 1968).

Similar to ability, attributional distortions of the worker's goal commitment, which is a measure of the subjects' perception of the worker's motivation to perform the task, increased as goal setting conditions increased in hedonic relevance for the supervisor. However, with this variable, attributional differences across goal setting conditions were found for failing workers only. Supervisors in the most hedonically relevant goal setting condition (assigned) attributed the worker's failure more to being uncommitted to the goal than did those supervisors in the least hedonically relevant condition (self-set). It appears as if supervisors were defensively attributing the failure of the worker to meet the assigned goal to causes internal to the worker—that is, goal commitment—rather than to external causes—the difficulty of the goal they set for the worker. Thus, the data support Jones and Davis' (1965) assertion that the hedonic relevance of an outcome acts to bias an observer's causal attributions. Moreover, the lack of a significant difference in pre-task goal commitment ratings across goal setting conditions, and the significant difference in post-task goal commitment ratings between success and failure conditions, simply reflects the prepotent role of behavior (performance outcome) in attributing internal states or dispositions to other people.

These data also have implications for the performance appraisal and goal setting literature. The results suggest that when goals are set solely by an employee, the perceived causes for success and failure are less subject to attributional biases than when goals are set participatively or are assigned by a supervisor. It is not recommended, however, that all goals be self-set; rather, if goals are assigned or set participatively, the supervisor or evaluator of the employee's performance should be made aware of attributional biases as well as the traditional biases that are typically discussed vis-à-vis performance appraisal (e.g., halo effect, central tendency errors, and leniency errors). Training programs such as that reported by Latham et al. (1975) should also include training in the avoidance of these additional attributional errors.

The implications of these findings are that (a) contrary to popular opinion, participation in goal setting may lead to less objective appraisals and attributions of performance and that (b) although the process variables involved in participative goal setting are not well understood, the relative difficulty of goal expectations held by a supervisor and worker as they

**enter the goal setting process distort both the causal attributions of performance and the performance evaluation itself. Future studies of participatory management should recognize this potential source of invalidity and attempt to develop methods of correcting these distortions.**

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# *Self-Report Measures of Job Characteristics and Affective Responses: An Examination of Discriminant Validity*[1]

**THOMAS W. FERRATT**
**Drake University**
**RANDALL B. DUNHAM**
**University of Wisconsin-Madison**
**JON L. PIERCE**
**University of Minnesota-Duluth**

*This paper reports an exploration of the discriminant validity of job design as measured by the JDS and JCI and job satisfaction as measured by the JDI, MSQ, IOR, and Stogdill's satisfaction with work scale (SWS). Job satisfaction as measured by the JDI or MSQ could not be adequately discriminated from job design measures obtained from either the JDS or the JCI. The IOR and SWS could be discriminated from the JDS and JCI.*

During the last two decades a great amount of research on worker reactions to job characteristics has been reported in the literature. In the vast majority of this research, job characteristics have been assessed via worker perceptions using instruments such as the Job Diagnostic Survey (JDS) (Hackman & Oldham, 1975) and the Job Characteristics Inventory (JCI) (Sims, Szilagyi, & Keller, 1976). The most common dependent variable in this research has been job satisfaction, which has been assessed through worker reports of affective states using instruments such as the Job Descriptive Index (JDI) (Smith, Kendall, & Hulin, 1969), the Index of Organizational Reactions (IOR) (Smith, 1976), the Minnesota Satisfaction Questionnaire (MSQ) (Weiss, Dawis, England, & Lofquist, 1967), and the Stogdill Satisfaction With Work Scale (SWS) (Stogdill, 1965).

An examination of these instruments, used to measure the two different constructs of job design and job satisfaction, reveals some striking

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similarities. For example, the JDI refers to "routine" and "simple" work characteristics to assess satisfaction, and the JDS uses similar terms in attempting to tap perceptions of variety. The directions for the JDS instruct respondents to indicate how descriptive an item is of their work situation. The directions for the JDI instruct respondents to indicate whether or not an item is descriptive of a specific aspect of their job. Given the common descriptive character of some of the job design and job satisfaction measures and their common focus on "your job/work properties," the following question emerges: Are measures of job design and job satisfaction gauging the same construct or do they discriminate between two constructs? The purpose of the present study is to determine if it is possible to discriminate between common measures of perceived job design (i.e., the JDS and JCI) and those of job satisfaction (i.e., the JDI, IOR, MSQ, and SWS).

In the early 1970s a similar concern regarding measures of organizational climate and job satisfaction was raised and investigated in a series of studies by Johannesson (1973), Guion (1973), LaFollette and Sims (1975), and Schneider and Snyder (1975). The last authors in this list point out that the JDI, a frequently used measure of job satisfaction, contains both *descriptive* and *evaluative* items. Smith, Smith, and Rollo (1974) found that the original JDI work scale factored into two sets of items reflecting descriptive and evaluative items. The inclusion of both descriptive and evaluative items in a job satisfaction scale runs contrary to a key conclusion emerging from this series of studies. Schneider and Snyder (1975) conclude that conceptual and empirical discrimination between climate and satisfaction is possible if climate is based on employee *descriptions* of the work place and job satisfaction is based on employee *evaluations* of salient aspects of their jobs.

Although organizational climate and job design are not the same constructs, they both are based on descriptions of specific aspects of jobs and the work place. Thus, the conclusion of the organizational climate/job satisfaction studies may be appropriate for studies measuring job design and job satisfaction. As noted above, though, job design and job satisfaction have not always been measured with instruments that keep description and evaluation separate. As a result, the measures used in the job design/job satisfaction studies may not have discriminant validity and may, in fact, be tapping the same construct.

If it is found to be true that the job design and job satisfaction measures have tapped the same construct, the implications for the interpretation of past and for the conduct of future job design research would be significant. To the extent that only one construct has been assessed, the internal validity of previous research would be called into serious question. Empirical relationships between the two constructs assumed to be distinct would be, at least in part, artifacts due to measurement similarity. In other words, much of the job design research of recent years (specifically that which focuses on relationships between perceived job design and worker reports of satisfaction) would have to be carefully reinterpreted. Although not all recent job design research involves such measurements, the vast majority does. In fact, if these concerns are supported, the validity of any research using the perceptual job design measures or the worker reported job satisfaction measures jointly or singly would be subject to reassessment because of uncertainty about the validity of the construct measure. It also is important to note that most recent theories concerning job design have been heavily based on the results of studies that utilized these types of measures. If the source of data used for theory building is invalid, the integrity of data-based theories also must be questioned.

To test the question of discriminability, the present study investigated a variety of combinations of job design and job satisfaction measures in three very different samples. If the JDS and JCI are measuring perceived job characteristics and the JDI, IOR, MSQ, and SWS are measuring worker affective reactions, it should be possible to discriminate empirically between the descriptive and affective scales. Given the theoretical causal relationship between perceived job characteristics and worker reactions, one would expect to find some correlation between job design and job satisfaction items. Nevertheless, if the two sets of instruments are truly measuring distinct phenomena, the instruments should demonstrate reasonable evidence of discriminant validity. The items from a perceived job characteristics scale should be more strongly related to each other than to items from a job satisfaction scale.

A number of alternative analytic techniques, all of which are based on deriving linear relationships among variables, could be used to assess discriminant validity. The present study will use one of these approaches (factor analysis) to determine if measures of perceived job characteristics and dimensions of job satisfaction can define distinct factors. It should be noted that this study will not focus on the dimensionality of subscales for either job design or job satisfaction instruments. The issue of dimensionality has been addressed elsewhere (Dunham, Aldag, & Brief, 1977; Pierce & Dunham, 1978; Smith, Smith, & Rollo, 1974; Dunham, Smith, & Blackburn, 1977). The primary concern here is with the discriminant validity of two major constructs—perceived job design and job satisfaction—*as they have been operationalized in the literature.*

## METHOD

### Instruments

*Job Diagnostic Survey*—The Hackman and Oldham (1975) JDS is an outgrowth of the job design research of Hackman and Lawler (1971). The five perceived task characteristics of skill variety, autonomy, feedback, identity, and significance are each measured by three questions.

*Job Characteristics Inventory*—The JCI was developed by Sims et al. (1976) and represents another approach to the refinement and further development of Hackman and Lawler's (1971) task design measure. The four perceived task characteristics of skill variety, autonomy, feedback, and identity are measured with three to five items per scale.

*Job Descriptive Index*—The JDI was developed by Smith et al. (1969) to measure worker reactions to five job facets: work itself, supervision, opportunities for promotion, pay, and co-workers. The facets of work itself and supervision, which are most closely related to the task dimensions measured by the JDS and JCI, are focused on in the present study. The potential similarity of the JDI work scale itself and the variety dimension of job design has been mentioned above. The JDI supervision scale has potential similarity to the autonomy and feedback dimensions of job design (e.g., see items "leaves me on my own," "praises good work," and "tells me where I stand"). These scales have 18 items each. Respondents reply by indicating whether or not each item is descriptive of their jobs.

*Minnesota Satisfaction Questionnaire*—The short-form of the MSQ was developed by Weiss et al. (1967). The 12-item intrinsic satisfaction scale, rather than the full 20-item short form that also includes extrinsic and general satisfaction items, was used because its items are more closely related to the task dimensions measured by the JDS and JDI (e.g., see items "the chance to do different things from time to time," "the freedom to use my own judgment," and "the chance to try my own methods of doing the job"). Although the items of this scale are generally descriptive, the respondent is not directed to indicate how descriptive the item is, but instead is directed to evaluate how satisfying or dissatisfying the item is.

*Index of Organizational Reactions*—The IOR was developed by Smith (1976) to measure eight job satisfaction facets: kind of work, amount of work, physical conditions of work, supervision, career future, compensation, co-workers, and company identification. Validation work on the IOR was reported by Dunham, Smith, and Blackburn (1977). The IOR kind-of-work scale is used in this study. It contains six items that require respondents to tell how they feel about their work.

*Stogdill's Satisfaction with Work Scale*—The 4-item SWS is presented by Stogdill (1965). Respondents reply by indicating whether the aspect of work addressed by each item is poorer or better than expected.

### Subjects and Data Collection

Samples derived from three independent research projects constitute the data base for the present study. The samples consisted of 155 insurance company employees, 295 employees from a pharmaceutical company, and 233 members of a statewide professional association of secretaries. Pairwise deletion of missing data was used to handle the small amounts of missing data. See Table 1 for the scales used in each sample as well as the scale means, standard deviations, and reliability estimates.

*Insurance Sample*—The sample of 82 males and 73 females was drawn from three job classifications (claims, clerical, and underwriting) in a

## TABLE 1
### Means, Standard Deviations, and Reliability Estimates

| | *Insurance Sample* | | | | *Pharmaceutical Sample* | | | | *Secretarial Sample* | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *N* | *Mean* | *S.D.* | *α* | *N* | *Mean* | *S.D.* | *α* | *N* | *Mean* | *S.D.* | *α* |
| JDS variety | 155 | 13.4 | 4.4 | .74 | 295 | 13.4 | 4.4 | .56 | 225 | 10.5 | 2.5 | .70 |
| JDS autonomy | 155 | 14.5 | 4.6 | .79 | 295 | 14.8 | 4.3 | .65 | 230 | 11.1 | 2.5 | .74 |
| JDS feedback | 155 | 13.9 | 3.5 | .69 | 294 | 15.0 | 4.0 | .60 | 227 | 11.0 | 2.9 | .83 |
| JDS identity | 155 | 12.9 | 4.6 | .70 | 295 | 14.3 | 4.5 | .56 | 231 | 12.9 | 2.2 | .82 |
| JDS significance | 155 | 16.6 | 3.8 | .71 | 295 | 17.7 | 3.2 | .39 | 226 | 11.1 | 2.5 | .55 |
| JCI variety | 155 | 13.1 | 4.9 | .90 | — | — | — | — | 224 | 17.3 | 3.7 | .77 |
| JCI autonomy | 155 | 19.0 | 4.5 | .85 | — | — | — | — | 223 | 18.8 | 3.2 | .56 |
| JCI feedback | 155 | 9.5 | 3.1 | .90 | — | — | — | — | 227 | 11.0 | 2.9 | .83 |
| JCI identity | 155 | 12.9 | 5.0 | .89 | — | — | — | — | 230 | 17.5 | 2.8 | .86 |
| JDI work | 155 | 30.7 | 11.9 | .86 | 293 | 30.9 | 12.2 | .86 | 217 | 42.8 | 7.5 | .69 |
| JDI supervision | — | — | — | — | 295 | 41.3 | 10.9 | .86 | 217 | 42.6 | 10.2 | .83 |
| MSQ intrinsic satisfaction | 155 | 41.7 | 8.8 | .90 | — | — | — | — | — | — | — | — |
| IOR kind of work | 155 | 19.8 | 5.7 | .92 | 295 | 22.5 | 5.5 | .89 | — | — | — | — |
| Stogdill's work satisfaction (SWS) | — | — | — | — | — | — | — | — | 231 | 15.8 | 3.2 | .89 |

multiple line insurance company (about 2000 employees) located in a midsize midwestern city. Data were collected by a paper and pencil questionnaire which was administered to the employees on job release time. Of the respondents, 31 percent were between the ages of 26 and 30, with an additional 28 percent of the sample between 21 and 25. Two-thirds of the respondents had been on the current job less than three years.

*Pharmaceutical Sample*—The sample of 125 males and 131 females represented over 90 percent of the employees in a pharmaceutical plant in a large metropolitan area. The paper and pencil questionnaire was administered to groups of about 60 employees, who were given job release time for completion of the survey.

*Professional Secretarial Sample*—The sample of 233 females represented 63 percent of the total membership of a statewide, professional association of secretaries in a midwestern state. Jobs ranged from secretary to office manager. The work locations of respondents were in both urban and rural areas. The size of each employing professional firm was less than 150. Data were collected via a paper and pencil questionnaire, which was mailed to all members of the professional association at their places of employment. Participation in the survey was voluntary. The average age of the respondents was 37, and the average job tenure was 6.4 years. Slightly modified versions of both the JDS and JCI were used to measure perceived task characteristics (a 5-point rather than 7-point response scale was used and the wording on some items differed slightly from the original).

**Analysis**

To test for discriminant validity a series of factor analyses was conducted. Each analysis included items from one of the perceived job design instruments and the items from one of the job satisfaction instruments. To demonstrate discriminant validity, job design and job satisfaction items should load on separate factors; if an item loads on more than one factor, the loading should be higher on the factor corresponding to the construct group to which the item belongs.

Previous research (Dunham, Aldag, & Brief, 1977; Smith et al., 1974) has indicated that the dimensionality of at least one of the perceived job design instruments (i.e., the JDS) and one of the job satisfaction instruments (i.e., the JDI) may not be stable across samples. Given the uncertain nature of the underlying dimensionality of the instruments, a factor analysis of the items from several test batteries was employed. Because factors were not expected to be orthogonal to one another, oblique rotations were used. Results were interpreted based on principal component factor analyses with oblique rotations with Kaiser normalization produced by SPSS (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975) using Delta = 0 and unities in the diagonals. The number of factors to be rotated was determined on the basis of a skree test of the unrotated eigenvalue pattern. In most cases, the number of factors indicated by the eigenvalue pattern matched the number of a priori dimensions. In a case in which the choice of the appropriate number of factors was not clear based on the skree test, the number of a priori dimensions was favored in the identification of dimensionality. Inspection of the resulting factor patterns allows empirical determination of the discriminant validity of the two theoretically distinct constructs.

## RESULTS

### The JDI with JDS and JCI

The JDI items were paired with the JDS for analysis in all three samples. The JDI also was paired with the JCI in the insurance and secretarial samples. Joint analyses of the JDI with both the JDS and JCI identified a moderate amount of convergence between what should be measures of two distinct constructs. This convergence is demonstrated using the results of two of the five analyses that involved the JDI. The results of the other analyses with the JDI were highly similar to those presented here but, for reasons of parsimony, only two are presented. (Results of analyses not presented here are available from the first author.)

Table 2 presents the results of the analysis involving the JDI work satisfaction scale and the JDS for the insurance sample. Examination of this table shows the confounding of the JDS and JDI items. Most of the confounding is between about half of the JDI work items (where item 2, with a .74 loading, is "routine") and JDS variety items. (See factor 1.) There also is some confounding of JDI work items (where items 3, 5, 9 and 18 are satisfying, good, pleasant, and gives a sense of accomplishment) and a

## TABLE 2
## Factor Analysis of JDI and JDS Insurance Sample[a]

| | | Factor | | | | | |
|---|---|---|---|---|---|---|---|
| | | *1* | *2* | *3* | *4* | *5* | *6* |
| JDS variety | 1 | .42 | -.05 | -.00 | .18 | -.46 | -.03 |
| | 2 | .37 | -.33 | -.17 | .21 | .01 | .36 |
| | 3 | .65 | -.12 | -.10 | .24 | -.04 | .06 |
| JDS autonomy | 1 | .14 | -.26 | -.13 | .34 | -.31 | .22 |
| | 2 | .12 | -.20 | -.19 | .19 | -.44 | .21 |
| | 3 | .17 | -.42 | -.17 | .29 | -.17 | .04 |
| JDS identity | 1 | -.00 | -.19 | .09 | .62 | -.24 | .07 |
| | 2 | .12 | .17 | .16 | .83 | .21 | -.17 |
| | 3 | -.09 | -.12 | .03 | .76 | -.06 | -.04 |
| JDS significance | 1 | .13 | -.65 | .03 | -.07 | -.09 | .01 |
| | 2 | -.04 | -.68 | .01 | -.02 | .05 | .19 |
| | 3 | .16 | -.61 | -.03 | .04 | .01 | .03 |
| JDS feedback | 1 | -.17 | -.54 | .17 | .15 | -.20 | -.08 |
| | 2 | -.29 | -.49 | .08 | .15 | -.37 | -.06 |
| | 3 | .20 | -.67 | .01 | .06 | .18 | -.22 |
| JDI work | 1 | .49 | -.11 | .30 | -.07 | -.27 | -.12 |
| | 2 | .74 | -.17 | .06 | -.08 | .00 | -.06 |
| | 3 | .20 | .18 | .04 | .10 | -.77 | .07 |
| | 4 | .50 | .15 | .07 | .12 | -.41 | .09 |
| | 5 | .05 | -.03 | -.16 | .11 | -.64 | -.06 |
| | 6 | .48 | -.20 | .10 | .07 | -.17 | -.28 |
| | 7 | .35 | -.26 | -.01 | .02 | -.27 | -.04 |
| | 8 | -.03 | .01 | .43 | -.04 | .05 | .43 |
| | 9 | -.11 | -.00 | .11 | -.08 | -.80 | -.06 |
| | 10 | -.03 | -.30 | .09 | -.05 | -.36 | .18 |
| | 11 | .40 | .30 | .27 | .22 | -.26 | .21 |
| | 12 | .33 | .01 | .24 | -.08 | -.05 | -.40 |
| | 13 | .51 | -.13 | -.00 | -.04 | -.40 | -.06 |
| | 14 | .17 | -.02 | .15 | -.29 | .03 | .65 |
| | 15 | -.02 | .02 | .79 | .10 | -.11 | .05 |
| | 16 | .53 | -.01 | -.05 | .16 | .01 | .18 |
| | 17 | -.00 | -.12 | .78 | .12 | .08 | -.03 |
| | 18 | .18 | -.07 | .13 | -.03 | -.70 | -.12 |

| | | Factor Intercorrelations | | | | | |
|---|---|---|---|---|---|---|---|
| | | *1* | *2* | *3* | *4* | *5* | *6* |
| | 1 | 1.00 | | | | | |
| | 2 | -.21 | 1.00 | | | | |
| | 3 | .14 | .00 | 1.00 | | | |
| | 4 | .26 | -.26 | .01 | 1.00 | | |
| | 5 | -.36 | .36 | -.18 | -.30 | 1.00 | |
| | 6 | .03 | .05 | .00 | -.01 | -.06 | 1.00 |
| Unrotated eigenvalues | | 10.06 | 2.43 | 1.68 | 1.60 | 1.37 | 1.29 |

[a]The order of the JDI items follows p. 83 of Smith et al. (1969).

JDS variety and autonomy item. (See factor 5.) It also can be noted that the JDS items failed to conform to their a priori dimensionality.

Table 3 provides the results of the analysis involving the JDI work and supervision scales and the JCI for the secretarial sample. This table shows confounding of JDI and JCI items. As in the previous analysis, there is

## TABLE 3
## Factor Analysis of JDI and JCI Secretarial Sample[a]

| | | *Factor* | | | | | |
|---|---|---|---|---|---|---|---|
| | | *1* | *2* | *3* | *4* | *5* | *6* |
| JCI variety | 1 | .07 | -.29 | -.06 | -.23 | -.15 | -.58 |
| | 2 | -.03 | -.34 | .15 | -.30 | -.07 | -.49 |
| | 3 | .00 | -.12 | -.00 | .04 | .03 | -.66 |
| | 4 | .03 | .02 | -.01 | .01 | -.02 | -.73 |
| | 5 | .21 | -.20 | .12 | -.18 | -.20 | -.47 |
| JCI autonomy | 1 | -.08 | .04 | .15 | -.69 | .09 | -.06 |
| | 2 | .24 | -.07 | .04 | -.67 | .04 | -.13 |
| | 3 | .00 | -.11 | .08 | -.72 | .10 | .06 |
| | 4 | .15 | -.04 | .11 | -.74 | -.13 | -.11 |
| | 5 | -.35 | .05 | .21 | -.37 | .24 | -.18 |
| JCI identity | 1 | -.03 | .02 | .76 | .09 | -.12 | -.12 |
| | 2 | .02 | .07 | .80 | -.07 | -.13 | .03 |
| | 3 | .04 | .13 | .82 | -.05 | .09 | -.03 |
| | 4 | -.04 | .07 | .79 | -.13 | -.02 | -.05 |
| JCI feedback | 1 | .49 | -.08 | .19 | -.28 | -.16 | .11 |
| | 2 | .66 | -.05 | .21 | -.38 | -.11 | .20 |
| | 3 | .47 | -.12 | .30 | -.29 | -.02 | .27 |
| JDI work | 1 | .07 | -.56 | .05 | -.10 | -.26 | -.16 |
| | 2 | .03 | -.20 | .24 | .11 | .12 | -.44 |
| | 3 | -.01 | -.78 | -.07 | .03 | .04 | -.02 |
| | 4 | -.03 | -.62 | -.04 | .09 | .26 | -.13 |
| | 5 | .16 | -.31 | .04 | -.02 | -.09 | .12 |
| | 6 | .00 | -.44 | -.10 | -.41 | -.02 | -.03 |
| | 7 | .07 | -.10 | .15 | -.04 | .10 | .01 |
| | 8 | .10 | -.00 | .18 | .09 | .16 | .11 |
| | 9 | .08 | -.28 | .17 | .03 | .14 | .14 |
| | 10 | .07 | -.35 | -.01 | .08 | .05 | .36 |
| | 11 | -.19 | -.43 | .15 | .05 | .38 | -.05 |
| | 12 | -.04 | -.24 | .16 | -.18 | .13 | .12 |
| | 13 | -.03 | -.79 | -.11 | -.03 | -.17 | -.22 |
| | 14 | -.03 | .02 | -.11 | .02 | .35 | .18 |
| | 15 | -.12 | -.13 | .37 | .26 | .47 | -.07 |
| | 16 | .01 | -.54 | -.18 | .05 | .08 | -.24 |
| | 17 | -.05 | .06 | .08 | .07 | .40 | .03 |
| | 18 | -.02 | -.81 | -.05 | -.03 | -.12 | -.08 |
| JDI supervision | 1 | .39 | .06 | .01 | -.37 | .07 | -.27 |
| | 2 | .02 | -.03 | .05 | -.29 | .58 | .03 |
| | 3 | .13 | .08 | -.07 | -.32 | .58 | -.03 |
| | 4 | .60 | .07 | .08 | -.10 | .17 | .02 |
| | 5 | .31 | -.01 | -.10 | -.10 | .43 | -.01 |
| | 6 | .53 | -.12 | .01 | -.00 | .11 | -.13 |
| | 7 | .51 | -.04 | -.04 | .03 | .16 | -.20 |
| | 8 | .53 | -.02 | .25 | .27 | .03 | -.08 |
| | 9 | .03 | -.10 | -.04 | -.19 | .61 | -.03 |
| | 10 | .57 | .06 | .05 | -.09 | -.12 | .05 |
| | 11 | .19 | .02 | -.02 | -.14 | .60 | -.05 |
| | 12 | .09 | -.04 | .13 | -.14 | .55 | .08 |
| | 13 | .54 | -.06 | -.24 | .12 | .21 | -.03 |
| | 14 | .31 | .00 | -.05 | .03 | .54 | -.11 |
| | 15 | .60 | -.16 | -.19 | .15 | .14 | .04 |
| | 16 | -.13 | .08 | -.15 | -.54 | .26 | -.02 |
| | 17 | .27 | -.09 | -.07 | .17 | .38 | -.11 |
| | 18 | .44 | .05 | .04 | .27 | .32 | -.21 |

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[a] The order of the JDI items follows p. 83 of Smith et al. (1969).

TABLE 3 (cont.)

| | | *Factor Intercorrelations* | | | | | |
|---|---|---|---|---|---|---|---|
| | | *1* | *2* | *3* | *4* | *5* | *6* |
| | 1 | 1.00 | | | | | |
| | 2 | -.21 | 1.00 | | | | |
| | 3 | .12 | -.12 | 1.00 | | | |
| | 4 | -.07 | .11 | -.15 | 1.00 | | |
| | 5 | .19 | -.12 | .09 | -.03 | 1.00 | |
| | 6 | -.03 | .17 | .01 | .10 | -.01 | 1.00 |
| Unrotated eigenvalues | | 8.22 | 4.22 | 3.92 | 2.67 | 2.45 | 1.89 |

[a]The order of the JDI items follows p. 83 of Smith et al. (1969).

some convergence of the JDI work items (where item 2, with a -.44 loading, once again is "routine") with variety items, but not as much as with the JDS variety items. (See factor 6.) The JDI supervisory items also were included in this analysis. The analysis indicated that many of the JDI supervision items (with the three highest loading items—4, 15, and 10—being praises good work, intelligent, and tells me where I stand) converged with the JCI feedback items. (See factor 1.) In addition, a JDI supervision item (item 16, leaves me on my own) converged with the JCI autonomy items. (See factor 4.) It also can be noted that the JCI items did conform to the a priori dimensionality.

## The MSQ with the JDS and JCI

The MSQ intrinsic satisfaction items were paired with both the JDS and JCI in the insurance sample. Joint analyses of the MSQ and job design items identified convergence similar to that found with the JDI. The results of pairing with the JDS and JCI were similar. Table 4 presents representative results from the MSQ-JCI analysis. Examination of this table shows confounding of variety, feedback, and autonomy items with MSQ intrinsic satisfaction items. (See factors 2, 4, and 5, where item 3 is the chance to do different things from time to time, item 11 is the praise I get for doing a good job, and item 10 is the chance to try my own methods of doing the job.) Again, it can also be noted that the JCI items did conform to the a priori dimensionality.

## The SWS with the JDS and JCI

The SWS was paired with both the JDS and JCI in the secretarial sample. Joint analyses of the SWS and job design items identified excellent discriminant validity evidence for both analyses. There was no convergence of SWS items with those of either the JDS or JCI. Table 5 presents

## TABLE 4
## Factor Analysis of MSQ and JCI Insurance Sample

| | | Factor 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| JCI variety | 1 | .04 | -.73 | -.12 | -.20 | -.06 |
| | 2 | .14 | -.65 | -.15 | -.07 | -.10 |
| | 3 | -.20 | -.86 | -.02 | .10 | -.01 |
| | 4 | .07 | -.80 | .08 | -.01 | -.00 |
| | 5 | -.02 | -.79 | -.20 | -.11 | .00 |
| JCI autonomy | 1 | -.09 | -.08 | .20 | -.01 | -.84 |
| | 2 | .15 | -.12 | -.11 | -.20 | -.61 |
| | 3 | .10 | -.04 | -.04 | -.19 | -.70 |
| | 4 | -.10 | -.10 | -.28 | .11 | -.57 |
| | 5 | -.00 | .12 | -.14 | -.09 | -.80 |
| JCI identity | 1 | -.14 | -.14 | -.85 | .05 | -.05 |
| | 2 | -.06 | -.19 | -.81 | -.01 | -.06 |
| | 3 | .07 | .02 | -.79 | -.04 | -.09 |
| | 4 | .11 | .09 | -.85 | -.05 | .07 |
| JCI feedback | 1 | -.01 | .04 | -.05 | -.86 | -.06 |
| | 2 | -.08 | -.05 | -.03 | -.90 | -.10 |
| | 3 | -.06 | -.03 | -.01 | -.83 | -.07 |
| MSQ | 1 | .69 | -.07 | .17 | .24 | -.14 |
| | 2 | .51 | -.04 | -.18 | .22 | -.39 |
| | 3 | .28 | -.64 | .01 | .00 | -.09 |
| | 4 | .56 | -.32 | .11 | -.22 | -.01 |
| | 5 | .56 | .03 | -.13 | -.23 | .12 |
| | 6 | .63 | -.03 | -.14 | .04 | -.02 |
| | 7 | .44 | .04 | -.01 | -.14 | -.13 |
| | 8 | .52 | .49 | -.08 | -.03 | .06 |
| | 9 | .46 | -.03 | -.10 | -.18 | -.41 |
| | 10 | .31 | -.03 | -.15 | -.26 | -.39 |
| | 11 | .29 | -.20 | .05 | -.43 | -.01 |
| | 12 | .57 | -.27 | -.16 | -.19 | .08 |

| | | Factor Intercorrelations 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| | 1 | 1.00 | | | | |
| | 2 | -.37 | 1.00 | | | |
| | 3 | -.23 | .31 | 1.00 | | |
| | 4 | -.28 | .24 | .30 | 1.00 | |
| | 5 | -.34 | .29 | .29 | .23 | 1.00 |
| Unrotated eigenvalues | | 11.21 | 2.42 | 2.19 | 1.93 | 1.40 |

the results of the analysis involving the SWS and the JDS. Examination of this table shows the excellent discriminant validity evidence with the joint use of the SWS and the JDS. It also can be noted that the JDS items conformed to a priori dimensionality with only a couple of minor cross-loadings between JDS scales.

## TABLE 5
## Factor Analysis of SWS and JDS
## Secretarial Sample

| | | *Factor* | | | | | |
|---|---|---|---|---|---|---|---|
| | | *1* | *2* | *3* | *4* | *5* | *6* |
| JDS variety | 1 | −.01 | −.05 | −.11 | .14 | .82 | −.03 |
| | 2 | .17 | .12 | .05 | .29 | .60 | .06 |
| | 3 | .09 | −.03 | .03 | −.15 | .75 | .04 |
| JDS autonomy | 1 | −.12 | .10 | .02 | .86 | .08 | −.02 |
| | 2 | .00 | −.03 | −.19 | .53 | .16 | .35 |
| | 3 | .13 | −.03 | −.02 | .82 | −.03 | −.03 |
| JDS identity | 1 | .02 | .87 | .05 | −.04 | .02 | −.01 |
| | 2 | −.07 | .87 | −.04 | .01 | −.04 | .12 |
| | 3 | .09 | .79 | −.11 | .05 | −.03 | −.07 |
| JDS significance | 1 | −.10 | .06 | .08 | −.08 | .12 | .87 |
| | 2 | .21 | −.03 | −.32 | .06 | −.16 | .52 |
| | 3 | .21 | −.01 | −.03 | .24 | −.13 | .46 |
| JDS feedback | 1 | −.01 | −.01 | −.84 | −.10 | .12 | .07 |
| | 2 | .04 | .02 | −.86 | .08 | −.05 | −.01 |
| | 3 | −.02 | .09 | −.86 | .03 | −.02 | −.11 |
| SWS | 1 | .76 | −.03 | −.17 | −.11 | .09 | .02 |
| | 2 | .88 | −.09 | −.01 | .07 | −.05 | .01 |
| | 3 | .92 | .09 | .00 | −.07 | .06 | −.03 |
| | 4 | .83 | .09 | .11 | .06 | .08 | −.01 |
| | | *Factor Intercorrelations* | | | | | |
| | | *1* | *2* | *3* | *4* | *5* | *6* |
| | 1 | 1.00 | | | | | |
| | 2 | .11 | 1.00 | | | | |
| | 3 | −.34 | −.18 | 1.00 | | | |
| | 4 | .27 | .21 | −.25 | 1.00 | | |
| | 5 | .26 | .04 | −.02 | .15 | 1.00 | |
| | 6 | .25 | .08 | −.25 | .27 | .11 | 1.00 |
| Unrotated eigenvalues | | 5.62 | 2.28 | 1.85 | 1.60 | 1.16 | .98 |

### The IOR with the JDS and JCI

The IOR work satisfaction items were paired with both the JDS and JCI in the insurance sample and with the JDS in the pharmaceutical sample. Joint analyses of the IOR with the job design items identified excellent discriminant validity evidence for all three analyses. Table 6 presents representative results of the analysis involving the IOR and JDS for the pharmaceutical sample. Examination of this table shows the extremely clean definition of the IOR and the complete lack of convergence with any of the JDS items. It also can be noted that the JDS items failed to conform well to the a priori dimensionality.

## DISCUSSION

An examination of job design–job satisfaction research suggests that the operationalization of job design and job satisfaction may be confounded. The results of the investigations reported in this paper reveal that these

### TABLE 6
### Factor Analysis of IOR and JDS Pharmaceutical Sample

| | | *Factor* | | | | | |
|---|---|---|---|---|---|---|---|
| | | *1* | *2* | *3* | *4* | *5* | *6* |
| JDS variety | 1 | .22 | .55 | .05 | .29 | –.18 | –.02 |
| | 2 | .12 | .76 | –.08 | .02 | .12 | –.24 |
| | 3 | –.07 | .46 | .36 | .12 | –.48 | –.06 |
| JDS autonomy | 1 | –.04 | .72 | .11 | –.06 | .08 | .16 |
| | 2 | .19 | .45 | .05 | –.27 | .12 | .23 |
| | 3 | .13 | .28 | .56 | –.15 | –.01 | .10 |
| JDS identity | 1 | .04 | .50 | –.09 | .16 | .07 | .42 |
| | 2 | .04 | –.14 | .26 | .10 | –.24 | .82 |
| | 3 | .08 | .15 | –.19 | .02 | .32 | .61 |
| JDS significance | 1 | .18 | .14 | –.07 | .73 | .03 | .04 |
| | 2 | –.03 | –.11 | .04 | .80 | .06 | .03 |
| | 3 | .12 | –.01 | .67 | .02 | –.01 | –.02 |
| JDS feedback | 1 | .07 | .27 | .29 | .14 | .59 | .07 |
| | 2 | .10 | .06 | .19 | .12 | .76 | –.12 |
| | 3 | –.04 | –.09 | .80 | .05 | .17 | .07 |
| IOR work | 1 | .65 | .03 | .10 | .16 | .04 | –.11 |
| | 2 | .82 | –.01 | –.03 | –.00 | .06 | .03 |
| | 3 | .74 | –.09 | .23 | .01 | .06 | –.08 |
| | 4 | .83 | .01 | –.05 | .09 | .02 | .09 |
| | 5 | .83 | .02 | –.11 | –.02 | –.00 | .16 |
| | 6 | .86 | .03 | .01 | –.06 | –.09 | –.06 |
| | | *Factor Intercorrelations* | | | | | |
| | | *1* | *2* | *3* | *4* | *5* | *6* |
| | 1 | 1.00 | | | | | |
| | 2 | .40 | 1.00 | | | | |
| | 3 | .26 | .22 | 1.00 | | | |
| | 4 | .26 | .14 | .12 | 1.00 | | |
| | 5 | .28 | .11 | –.03 | .16 | 1.00 | |
| | 6 | .18 | .20 | .08 | –.04 | .11 | 1.00 |
| Unrotated eigenvalues | | 6.70 | 1.82 | 1.51 | 1.31 | 1.17 | 1.03 |

concerns are justified in some instances, but not in others. Specifically, the findings of these studies suggest that confounding occurs consistently between the JDI and perceived job design measures. Similarly, but to a lesser degree, confounding also occurs between the MSQ and job design measures. (A study by Pierce, Dunham, and Cummings [1978] presented evidence suggesting weaker convergence of the MSQ and JDS than found here.) On the other hand, however, there was absolutely no evidence of any confounding when either the IOR or the SWS measures of satisfaction were utilized with either of the job design measures. This is consistent with the findings of Pierce et al. (1978) for the IOR.

The perceptive reader may note that the two measures having no overlapping items are also the measures with the fewest items. An argument could be presented that the more items a scale has the more likely its items are to emerge with "stray" loadings and vice versa for less items in a scale. This argument is more likely to hold with broadly defined measures rather than with narrowly defined ones. Such measures have more items for measurement but may lose discriminant validity compared to more narrowly defined measures. Thus, job satisfaction may have a more narrow operational definition with the two shorter measures (i.e., the IOR and SWS) compared with the longer measures (i.e., the JDI and MSQ).

This pattern of results suggests that the problem of confounding is most likely a measurement problem rather than a problem of construct definition. This point is made even clearer by the findings that, even within the same sample, the JDI but not other satisfaction measures are confounded with job design measures. See, for example, Tables 3 and 5. The results reported in this paper demonstrate that there are two constructs that can be both conceptually and empirically differentiated. Certain measures, however, fail to meet the critical requirements for empirical discrimination.

These results are cause for concern. It appears that a large volume of recent job design research (that using the JDI or MSQ in conjunction with the JDS or JCI) may have possessed inadequate internal validity due to the confounding of these measures. It is not possible to ascertain the exact degree to which job design–job satisfaction relationships reported in the literature have been artifacts of the measurement techniques utilized. It is quite likely, however, that this has occurred to some substantial degree. The results of those studies therefore are highly suspect and will need to be carefully reinterpreted.

The primary conclusion drawn from the present research is that the use of the JDS (or JCI) with the JDI or MSQ (unless modified by removing nondiscriminating items) may lead to artifactual relationships due to measurement problems. A second conclusion is that some measures of worker responses are more appropriate than others for use in conjunction with measures of perceived job characteristics. Among the more appropriate measures may be the IOR and the Stogdill measures of satisfaction. Given the present findings, however, it might be advisable to check for discriminant validity before beginning hypothesis testing involving measures of this type. A somewhat broader issue is that of the validity of the JDI and MSQ as pure measures of job satisfaction under any conditions. This merits further investigation.

One issue raised by the present investigation goes beyond the immediate concern with the specific measurement instruments analyzed in this study. Specifically, it must be asked if description and evaluation are separable processes. If individuals respond to self-report measures as directed, as implied by Schneider and Snyder (1975) in the conclusion to their study of organizational climate and job satisfaction measures, then one instrument should lead them to describe a situation (as should the JDS or JCI) and another instrument should lead them to evaluate a situation (as should the job satisfaction measures). In the data analyzed here, however, even the MSQ scale (which instructs respondents to be evaluative) showed some overlap in measurement domain with the JDS and JCI (which should be descriptive). This finding is disturbing because it suggests that description and evaluation may not be separable processes. If description and evaluation are not separable processes, research into relationships between perceptions and evaluative attitudes becomes suspect.

Other evidence from this study and the previously cited studies on organizational climate and job satisfaction measures, however, suggests that these processes are in fact separable. First, results from the climate and satisfaction studies, specifically Schneider and Snyder (1975) and LaFollette and Sims (1975), indicate that responses to climate measures (description) reflect aspects of the work world that are not the same as responses to measures of satisfaction (evaluation). Second, although some factors emerged in this study with both descriptive and evaluative items, an inspection of the results reveals that a large number of factors emerged that were purely descriptive or purely evaluative. An example of a factor with both descriptive and evaluative items is shown in Table 2 where factor 5, which is primarily evaluative items from the JDI (e.g., satisfying, good, and pleasant), also includes descriptive items from the JDS variety and autonomy scales. Examples of purely descriptive or evaluative factors are clearly evident in those analyses in which no overlap occurs between job design and job satisfaction measures (e.g., see Tables 5 and 6) as well as in some analyses in which overlap does occur between these measures. For example, although factor 6 in Table 3 has overlap between JCI variety and JDI items, all overlapping items are descriptive. And, third, two highly evaluative measures (i.e., the IOR and SWS measures) show both conceptual and empirical discriminant validity with the prima facie descriptive measures of this study (i.e., the JDS and JCI). Given the results of this study, researchers would be well advised to use more purely affective measures of satisfaction when investigating job design–job satisfaction (or other descriptive-evaluative) relationships.

Furthermore, a number of job elements assessed by the JDI and MSQ are similar to those tapped by the JDS and JCI and appear to be more descriptive than evaluative. Examples of the JDI items that tend to have moderate or high cross-loadings with the JDS or JCI are: fascinating, routine, creative, and challenging from the work scale and leaves me on my own, praises good work, and tells me where I stand from the supervision scale. The MSQ items that tend to have moderate or high loadings with the JDS and JCI are: the chance to do different things from time to time, the freedom to use my own judgment, and the chance to try my own methods of doing the job. The similarity between these items and the variety, feedback, and autonomy items of the JDS and JCI may help explain the empirical convergence of these measures.

Finally, another interpretation of this evidence suggests that the overlapping items are complex, that is, they are not pure and contain both descriptive and evaluative components. This interpretation is particularly noteworthy given the overlap between the MSQ (an instrument that directs respondents to present affective, i.e., evaluative, responses to descriptive items) and the job design measures (instruments that direct respondents to present descriptive responses to descriptive items). Given the present findings, it would be appropriate to conduct additional research specifically designed to provide a more thorough answer to the question of the conditions under which description and evaluation can be separable processes when self-report measures are used.

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# *The Relationship Between Job Attitudes and the Decision to Retire*

**NEAL SCHMITT**
**JOSEPH T. McCUNE**
**Michigan State University**

*For a group of civil service employees, discriminant analysis indicated that job attitude and financial variables contributed significantly to the prediction of retirement status even when the effects of various demographic variables, including job levels and education, were removed. Health was not a statistically significant factor.*

Traditionally, retirement has been an automatic process whereby the organization terminated the employment of a worker when she/he reached the age of 65. Employees who decided to retire before the age of 65 often did so because of illness and were penalized through actuarial reductions in their pension benefits. However, recent government actions and company policy changes have provided employees with greater flexibility in deciding when to retire. The Age Discrimination in Employment Act Amendments of 1978 eliminated mandatory retirement for most federal workers and prohibited mandatory retirement for most public and private workers before the age of 70. Pension contracts negotiated by some of the large unions, the so-called "30 and out" plans, allow eligible employees to retire before the age of 65 with full retirement benefits. These developments have increased the importance of the decision to retire, yet there has been little actual research concerning the factors influencing this decision. Reported in the present paper are data concerning differences in income, health, demographic considerations, and job perceptions of early retirees and a group who decided to remain on the job even though early retirement was possible with full pension benefits.

In their review of the retirement literature, Walker and Price (1976) found that a number of factors affected the decision to retire. Research findings indicated that the following factors were involved to some extent in raising the retirement age of workers: (1) economic necessity, (2) fear of inflation, (3) work ethic, (4) job satisfaction, (5) fear of death and the belief that retirement signals death, and (6) perception that retirement reduces overall life satisfaction. Those characteristics associated with lower retirement age were: (1) poor health, (2) adequate pension benefits, (3) job dissatisfaction, (4) the individual's perception of being unable to keep up with the demands of work or the changes in work technology.

In a study similar to that reported here, Barfield and Morgan (1969) investigated the factors related to the decision to retire early among a group of auto workers and a national sample. The results of their study indicated that financial factors—primarily, expected retirement income, number of dependents, and house equity—were the most important factors influencing retirement plans in both samples. The individual's subjective evaluation of health correlated highly with early retirement, but other situational and attitudinal variables were of less importance in the decision to retire. In a follow-up study of automobile workers Barfield (1970) found that workers who had stated that they expected to retire before age 65 in their earlier study had actually retired. The best single predictor, ratio of preretirement to postretirement income, accounted for 37 percent of the total variance in propensity to retire. Barfield and Morgan's (1969) results were further corroborated by a similar cross-sectional study by Schmitt, Coyle, Rauschenberger, and White (1979).

The present study was designed to further the understanding of the retirement decision. Specifically, people who responded to the earlier survey by Schmitt et al. (1979) were asked to indicate their retirement status a year after the original data collection. This afforded the opportunity to evaluate the extent to which job attitudes and perceptions are predictive of the early retirement decision rather than simply correlated with retirement status. In addition, it was possible to assess the contribution of job attitudes and perceptions to retirement status while statistically removing the predictability associated with income, health, and demographic variables. The demographic characteristics included age, job level, and education, and these variables were entered first in a discriminant analysis. Thus, the analysis also provides a test of the effect of finances controlling for job level, age, and other seemingly obvious correlates of the retirement decision. This is important on a practical policy level if one is interested in using financial incentives to influence the retirement decision, as is true of most governmental or organizational efforts in this regard. It is possible that people will want to continue to work in spite of the financial attractions of a retirement package simply because they enjoy the work or that they will retire even with a financial loss because they dislike the work they do.

## METHOD

### Sample

The names and addresses of 1,000 Michigan civil service employees were randomly selected from state civil service records with the stipulation that they be at least 55 years old with at least 30 years of service. Hence, all potential respondents were eligible to retire by state law. Of these 1,000, 51 percent or 513 returned the first questionnaires, and 74 percent or 379 completed the follow-up survey. The average civil service level of the respondents was equivalent to a low level professional, but the entire range of job levels was represented in the sample. Nonrespondents to the first questionnaire did not differ from respondents on the sex and age variables, which were the only two available for the nonrespondent group. Those responding to the first questionnaire but not the second did not differ significantly from people who responded to the second questionnaire on any of the variables that are the subject of this paper.

Questionnaire packages were mailed to all respondents with a cover letter explaining the purpose of the study. A second wave of questionnaires was mailed one year later to those who had completed and returned the first questionnaire. In the second questionnaire, respondents were asked to indicate their retirement/employment status. All participants were paid $3 for completing and returning each questionnaire.

### Demographic Variables

Demographic variables included race, age, sex, marital status, education, job level, size of the community in which respondents lived, and the length of time lived in that community. The population of the community in which respondents lived was measured on a scale with eight response options: (1) rural, (2) less than 999, (3) 1,000-4,999, (4) 5,000-9,999, (5) 10,000-24,999, (6) 25,000-49,999, (7) 50,000-99,999, (8) 100,000 or greater. Time lived in that community was measured using a 5-option response scale: (1) less than a year, (2) 1-5 years, (3) 5-10 years, (4) 10-20 years, (5) more than 20 years. Respondents were asked to give their civil service job level. These values ranged from 1-18 for the respondent group. The mean of 10 is a low level professional. The 18 level is a high level administrative position. Education was indexed on a 6-point response scale ranging from did not finish high school to graduate study. Age responses were made to one of five options ranging from under 55 to over 70 in five-year increments.

### Financial Variables

Measures of financial variables included items requesting respondents' actual wage and alternative sources of income as well as measures of the perception of the adequacy of their income. Respondents reported their actual hourly wage on a scale ranging from less than $3/hour to more than $15/hour. Knowledge of the existence of their pension plan was measured on a no, don't know, yes scale, as was their perception of the adequacy of their retirement income at 65 and at some earlier retirement time. Needed retirement income and expected retirement income were measured on

9-point scales ranging from less than $300/month to more than $1,000/month. Importance of adequate retirement income was measured on a 4-point scale ranging from of no importance to extremely important. Finally, respondents were asked to indicate the number of dependents they had excluding themselves and whether or not their spouse was employed.

### Health Variables

Subjects were asked to indicate their overall health on a 4-point scale with 4 equal to excellent and 1 equal to poor. They also were asked to indicate the number of times they visited a physician or were forced to miss work or change plans within the past year because of illness. Responses to those two items were made on a 5-point scale ranging from never to 13 or more times.

### Job Attitude Variables

The Job Diagnostic Survey (Hackman & Oldham, 1975), which consists of 21 items measuring perceptions of autonomy, skill variety, dealing with others, feedback from the job, feedback from others, task identity, and task significance, was used to measure how the respondents viewed their current job. Scores on all of these scales except feedback from others and dealing with others were used to compute the motivating potential score (Hackman & Oldham, 1975). The short form of the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England & Lofquist, 1967) was used to assess job satisfaction. Job involvement was indexed by a 4-item instrument previously used by Rabinowitz, Hall and Goodale (1977). A 1-item measure of desire to work was used to assess the respondents' desire to continue working at a job they like. The four response options on this scale ranged from extremely important to of no importance.

### Data Analysis

Reliability analyses were performed on each of the multi-item scales used in the study.

A stepwise discriminant analysis was performed to assess the relationship of the total set of predictor variables collected at time 1 to the retirement status of each subject at the time of the second survey. The overall test used to assess the significance of the relationship to retirement status was an *F*-test of the separation between groups. This test takes into consideration the differences between group centroids and the homogeneity within groups (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). Further, demographic variables were included at the first step so as to test the effect of finances and health independent of their demographic correlates. The second step included the financial variables; the third assessed the predictability added by health variables; and the last step involved the entry of the job attitude information. It should be noted that many of the demographic variables may contain a financial or motivational component; for example, job level certainly corresponds to wage levels.

## RESULTS

Internal consistencies of those scales with multiple items all exceeded .70 with the exception of the dealing with others measure, which had an internal consistency of only .30. This variable was deleted from subsequent analyses. The means of each predictor variable for the retirees and nonretirees and $F$-values for the test of significance of the difference between means are reported in Table 1. Because of missing data, these analyses were based on less than the total sample size of 379. Obviously, these variables are intercorrelated, so these significance tests are not independent and the data are presented for descriptive reasons only.

The results of the stepwise discriminant analysis[a] on retirement status with financial, health, demographic and job attitude variables also are presented in Table 1. The analysis is based on a sample of 143 because of missing data and the use of listwise deletion. Of these 143, 23 percent or 33 had retired between the two surveys. Intercorrelations among the different sets of variables was generally low ($<.30$). An exception were the correlations between job level and education and reported income, which were both in the .50s. This multicollinearity makes interpretation of the discrimination coefficients problematic. The coefficient for education is low and negative, that for job level is high and positive, and the means for the two groups presented in Table 1 indicate that both univariate relationships are positive.

The canonical correlation of the dependent variable and the entire set of predictors was .61, which represents a statistically significant relationship ($p<.001$). The set of demographic variables was not significantly related ($p<.05$) to retirement status, even though the univariate relationships between retirement status and both job level and age were significant. An $F$-test to test the contribution of sets of variables when variables previously entered into the analysis are held constant is provided by Cohen and Cohen (1975). Application of this test yielded a significant result for the addition of the financial variables to the demographic set, $F(9, 125)=3.32$, $p<.01$. The health variables added nonsignificantly, $F(3, 122)=1.28$, $p>.05$; but the job attitude variables entered last did add significantly to the prediction of retirement status, $F(5, 117)=2.57$, $p<.05$.

The prediction results indicate that by using the results of the discriminant analysis and the data on the measures collected at time 1, one could correctly classify the retirement status of 66.4 percent of the people a year later. This represents a statistically significant difference ($p<.001$) from chance level, which would be about 52 percent. It should be pointed out that the classification results are based on the total sample because the

## TABLE 1
## Sample Size and Means of Retiree and Nonretiree Groups and Discriminant Analysis of All Variables on Retirement Status

| | Retirees | | Nonretirees | | Discriminant Analysis Results[d] | |
|---|---|---|---|---|---|---|
| *Variables* | *Mean* | *N* | *Mean* | *N* | *Standardized Coefficients* | *Canonical Correlation* |
| *Demographics* | | | | | | *Step 1* |
| Size of community | 4.61 | 137 | 5.68 | 222 | −.24 | .33 |
| Time in community | 4.45 | 141 | 4.38 | 224 | .18 | |
| Job level | 8.83 | 108 | 11.11 | 169 | .52 | |
| Education | 2.94 | 134 | 3.59 | 217 | −.12 | |
| Age | 2.85 | 136 | 2.45 | 223 | .36 | |
| Sex[a] | 1.39 | 138 | 1.18 | 218 | .18 | |
| Race[a] | 1.96 | 143 | 1.99 | 225 | .13 | |
| Marital status[a] | .83 | 145 | .85 | 227 | .00 | |
| *Financial* | | | | | | *Step 2* |
| Actual income | 5.31 | 75 | 6.51 | 223 | −.31 | .53* |
| Number of dependents | 1.65 | 142 | 2.05 | 224 | .13 | |
| Company retirement plan | 2.88 | 56 | 2.91 | 221 | .06 | |
| Needed retirement income | 6.48 | 60 | 7.59 | 217 | −.18 | |
| Expected early retirement income | 4.64 | 59 | 5.66 | 214 | −.38 | |
| Adequacy of early retirement income[b] | 2.56 | 57 | 2.13 | 217 | .44 | |
| Adequacy of retirement income at 65[b] | 2.81 | 58 | 2.58 | 220 | .04 | |
| Importance of adequate income[c] | 2.60 | 53 | 3.24 | 216 | −.45 | |
| Employed spouse[a] | .74 | 145 | .67 | 227 | −.14 | |
| *Health* | | | | | | *Step 3* |
| General health | 1.93 | 139 | 1.91 | 224 | −.15 | .55* |
| Doctor visits | 2.17 | 140 | 2.02 | 225 | −.11 | |
| Illnesses | 1.79 | 140 | 1.60 | 223 | .36 | |
| *Job Attitudes* | | | | | | *Step 4* |
| Feedback from others | 13.43 | 133 | 12.66 | 221 | .33 | .61* |
| Motivating potential score | 4670.28 | 122 | 5096.36 | 203 | | |
| Job satisfaction | 77.47 | 123 | 79.24 | 199 | −.20 | |
| Job involvement | 12.90 | 138 | 13.88 | 223 | .09 | |
| Desire to work[c] | 2.31 | 54 | 2.69 | 216 | −.50 | |

| Centroids | |
|---|---|
| Retirees | 1.40 |
| Nonretirees | −.42 |

Prediction Results

| Actual Group | Predicted Retirees | Group Nonretirees |
|---|---|---|
| Retirees | 205 | 22 |
| Nonretirees | 103 | 42 |

% correctly classified = 66.4
$X^2$ (1) = 40.01, $p < .001$.

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[a] Males were scored 1, females 2; nonwhites were scored 1, whites 2; married was scored 0, single 1; employed spouse was scored 0, others 1.

[b] Scale was 1 = no, 2 = not sure, 3 = yes.

[c] Scale was a 4-point scale with 4 being most important.

[d] Because of missing data and listwise deletion, the multiple discriminant analysis was based on a sample of 143. The classification results included all cases; missing data were replaced by the mean of that variable in computing a predicted status.

* $p < .05$

mean of variables was used to replace missing data in making classifications. The classification function, on the other hand, was computed on $N = 143$ because of use of listwise deletion. The classification results, then, indicate that the classification function computed on the portion of cases on which complete data are available was appropriately applied to the entire sample.

Of the income variables, those adding significantly ($p < .05$) to the discriminant function included hourly wage, the expected early retirement income, and the perceived adequacy and importance of that income. As indicated above, the health variables as a group did not contribute to the prediction of retirement status. Of the job attitude variables, motivating potential score, and the desire to work added significantly ($p < .05$) to the discriminant function. It should be noted that within each category of variables there was considerable redundancy; if there had been some reason to order the variables within these sets, the results may have been different.

The discriminant analysis for the most part is consistent with the mean differences between groups presented in Table 1 in that the mean differences parallel the signs of the discriminant function coefficients. However, the job level results are inconsistent in that with the entire set of variables, the job level variable has a positive coefficient indicating high job level is associated with retiree status, but the means for the two groups indicate the opposite is true. This is, of course, a suppressor effect resulting from the relatively high intercorrelations among the job level, education, age, and income variables.

## CONCLUSIONS AND IMPLICATIONS

In conclusion, the results of this study provided longitudinal support of previous research findings that demonstrated that financial variables are very important in the retirement decision of employees. Finances were found to be important even when controlling for job level and a variety of other demographic variables. This is particularly important, given that the subjects were all civil service employees whose within-job level differences in pay were not substantial. Perceptions of the adequacy of one's retirement income, the importance of retirement income, as well as one's actual income, are significantly related to the decision to retire. Surprisingly, however, those individuals with lower retirement incomes and lower job levels are more likely to retire. One possible explanation is that these are people who hold lower level, less stimulating jobs. Consistent with this explanation is the finding by Pollman and Johnson (1979) that the frequency of job changes, which more often are found in assembly line and other mechanically paced jobs, was related to the decision to retire early.

On the whole, the finding that health and demographic variables played a minimal role in determining retirement status is not consistent with the Barfield and Morgan research (1969).

The job attitude variables did add significantly to the prediction beyond that afforded by financial, health, and demographic variables. The two significant variables suggested that those who retired early viewed their jobs as less involving and challenging, though retirees and nonretirees were equally satisfied with their jobs as indexed by the Minnesota Satisfaction Questionnaire. A single item asking how much they wanted to work was the best predictor. It seems appropriate to conclude, then, that financial incentives or disincentives are relatively effective in influencing retirement decisions, but that job attitudes do play a role in the decision to retire. This is supported by the attitudinal data and also by the data on job level and income, which indicates that people in lower level, less satisfactory jobs, are retiring earlier. People in these low level jobs will retire if their financial situation allows.

The generalizability of the results of the study may be limited to civil service workers in Michigan. The results, however, are similar to those of the Barfield and Morgan (1969) study of the retirement decisions of automobile workers. The major difference is that present results indicate a relatively less important role for health variables and a more important role for job attitudes. The Barfield and Morgan autoworkers may have had jobs in which physical demands were more significant and job attitudes less variable than the workers in the sample reported here.

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# *The Relationship Between Conflict Resolution Approaches and Trust— A Cross Cultural Study*[1]

**JEREMIAH SULLIVAN**
**RICHARD B. PETERSON**
**University of Washington**
**NAOKI KAMEDA**
**Aoyama Gakuin University**
**JUSTIN SHIMADA**
**Portland State University**

*This study investigated whether the manner in which conflicts are resolved in Japanese-American joint ventures in Japan influences the level of future mutual trust. Japanese managers perceived a higher level of future trust when disputes are resolved through conferral, except when an American is in charge of operations. Then they designated contracts requiring binding arbitration.*

During the past ten years there has been a major increase in the amount of direct investment by American and Japanese firms in the other country. Much of the direct investment has taken the form of joint ventures in which both partners play a role in the operation of the venture located in Japan or the United States.

Many of the joint ventures have proven rather successful, but others have encountered major problems. In some cases like Singer, Kraft Foods, TRW, and Union Carbide, the joint venture has even failed (*Wall Street Journal*, 1976). Three problems receive primary focus in the literature. First, there often are differences in the primary goals of the partners. American companies place high priority on profitability, but the Japanese partner may emphasize increasing market share or gaining access to Western technology (Fox, 1977; Yoshino, 1968; Peterson & Shimada, 1978).

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Second, the key representatives for the partners encounter major communication problems in operating the joint venture (Peterson & Schwind, 1977). The lack of fluency by both American and Japanese executives in the other person's language (Reischauer, 1977) leads to a feeling that both sides are unwilling to be open and discuss problems. Finally, the most difficult problem, no doubt, is their inability to understand the cultural basis of each other's managerial perspective due to important cultural differences (DeBettignies, 1971; Nakane, 1970; Peterson & Shimada, 1978; Peterson & Schwind, 1977).

The primary thrust of this paper is to determine preferred strategies by Japanese and American managers for resolving conflict over differences between the partners regarding short term goals for the venture. Furthermore, the impact of differing modes (conferring or binding arbitration) of conflict resolution on future trust in the joint venture is tested under experimental conditions.

## CHARACTERISTICS OF THE BUSINESS RELATIONSHIP

It will be helpful to provide a background for the study by presenting some key information concerning differing cultural values, modes of conflict resolution, and the element of trust.

### Cultural Values

One notes major differences in the ways by which American and Japanese executives make key decisions regarding major goals and objectives. The typical American (and Western) approach to decision making is for the executive to gather relevant information, ask for advice, and then arrive at a decision (Drucker, 1971). The evaluation is based on whether the decision is effective and/or efficient.

The Japanese manager, on the other hand, is more likely to emphasize the process by which the decision is made. The Japanese emphasize that the important element in decision making is defining the question. Once the question is framed by the group, consensus on the decision itself is more likely (Drucker, 1971). This method of group decision making in Japan is widely noted in the literature (Hattori, 1978). For purposes here, the intriguing point is the importance of maintaining harmony and the right spirit in the decision making process. A number of writers have commented on the key element of harmony (Drucker, 1971; DeBettignies, 1971; Reischauer, 1977) and the right spirit (Fox, 1977; Noda, 1975). Creating and maintaining harmony for the Japanese places primary emphasis on reaching consensus, the nature of indeterminacy (Peterson & Shimada, 1978), indirect speech, and the use of subtle nuances in communication. These emphases become salient in procedures and behaviors adopted to resolve conflict and to build trust.

## Conflict Resolution

American and Japanese business people also differ in terms of their preferred methods of resolving conflict within their organizations. The American manager may well use direct and confrontive legal tactics in dealing with other domestic firms if other methods fail. As a result, it is not uncommon that firms engaged in joint dealings will use business contracts that provide for arbitration of commercial disputes between them. Often the American Arbitration Association is designated as the agency to hear such disputes.

The situation is far different in Japan. There, one finds that Japanese businessmen do not commonly use formal detailed contracts stressing strict performance and enforcement in their domestic business relations. Rather, they prefer flexibility in responding to unfolding problems (Henderson, 1975). If some contractual language is necessary, a phrase like the following translation is sometimes used: "All items not found in this contract will be deliberated and decided upon in a spirit of honesty and trust" (Japan Trade Center, n.d., p. 3).

Arbitration is not unknown in Japanese business relationships. In fact, the Japanese Commercial Arbitration Association (JCAA) is designed to educate the parties on arbitration and to conduct hearings in disputes. However, unlike the adversary process in the United States, Japanese arbitration encompasses the element of compromise. The JCAA initially serves in a mediator role to induce settlement by the parties. Less than 1 percent of all cases brought to the JCAA end in binding arbitration. Even there, the stress is on compromise (Henderson, 1975).

Contractual language requiring binding arbitration is increasingly common in Japanese-American joint venture situations. The primary reason appears to be the pressure exerted by the American partners. The Japanese would prefer emphasis on harmony and compromise rather than stressing the legalistic approach, yet such legalism often is viewed by the Japanese partner as necessary in light of American demands.

The problem of how to resolve disputes is particularly acute, for example, if one of the partners wants to change the primary goals of the venture by increasing the profit share taken from the venture through reduction of the money that both partners plow back into the subsidiary. When such disagreements exist, the American firm favors the renegotiating of the contract (Peterson & Shimada, 1978). If that step fails, binding arbitration often is requested (Henderson, 1975). The Japanese, however, although they have an arbitration association, would opt for mediating the dispute through conferral by the parties (Henderson, 1975; Ballon, 1978; Peterson & Shimada, 1978).

## Trust

Trust plays a crucial role and is the essential requirement for the Japanese partner for a successful relationship to operate (Block, 1972; Lifson, 1979). If the parties trust one another, then renegotiation of the formal contract or the use of arbitration is unnecessary (Ballon, 1978; Peterson & Shimada, 1978). In fact, the request for arbitration, in itself, is an admission of low trust. To the Americans, as to most Westerners, the legal contract and formal negotiation process are a common modus operandi. The use of binding arbitration, therefore, is not evidence of distrust but of differences in interpretation or understanding. For the Japanese, however, the resolution of conflict through binding arbitration might lead to a decline of mutual trust in the joint venture.

## RESEARCH DESIGN

Does the way in which conflicts are resolved in a joint venture influence the level of future trust between the key representatives of the venture? To answer this research question an experiment was conducted with Japanese managers experienced in joint ventures and international trade. A similar group of American managers was also studied for comparative purposes. Two hypotheses were developed:

1. *Japanese managers will perceive the level of future trust in a joint venture to be greater when a joint venture contract requires mutual conferral to resolve disputes rather than binding arbitration.*
2. *Japanese managers will perceive the level of future trust to be greater when a conflicting American partner requests mutual conferral to resolve disputes rather than binding arbitration.*

A 2 (Japanese vs. American president of venture) × 2 (contract requiring conferral to resolve disputes vs. contract requiring binding arbitration) × 2 (disputing American partner requests conferral vs. American requests binding arbitration) factorial design was constructed for the Japanese sample, and a similar design was employed for the American sample.

## METHOD

### Subjects

*American Sample*—Contacted by mail were 100 American managers who were asked to take part in the study. Of these, 48 completed the test material for a response rate of 48 percent. The managers were selected from a mailing list obtained from the U.S. Department of Commerce. They represented approximately 40 different firms engaged in manufacturing, importing-exporting, food processing, consulting, transportation, and legal work. Most of the firms are located on the West Coast.

*Japanese Sample*—Contacted by mail were 156 Japanese managers. Of these, 72 responded, for a response rate of 46 percent. Most of the managers' names were obtained from mailing lists of trading company personnel in Japan. Table 1, which compares the American sample with the Japanese, suggests the similarity of the two groups in age, education, and

TABLE 1
**Comparison Between American and Japanese Samples**

| | *American (N=48)* | *Japanese (N=72)* |
|---|---|---|
| Mean age | 41.54 | 39.46 |
| Mean education (years) | 16 | 16 |
| Mean work experience (years) | 16.54 | 14.83 |
| Mean joint venture experience (years) | 4.67 | 2.68 |

experience. (About 90 percent of the American sample were middle managers. A few were senior executives of small firms. None were senior executives in large firms. The Japanese managers were department heads and other middle managers engaged in sales and trading activities in the following industries: electronics, machine manufacturing, chemical goods, retailing, and trading. All were middle managers.)

### Procedure

Each of the subjects read a scenario, described below, and then completed a 3-page questionnaire. A cover letter, similar for both groups, asked each participant to make decisions based on how he felt about the situation and not on what he thought might be the conventional or textbook thing to do. Thus the letter cautioned against socially desirable responses. (The issue could be raised that someone other than the person addressed in the letter actually responded. Follow-up communications with about one-third of both samples suggested, however, that those to whom the questionnaires were sent were the ones who responded.)

*Scenario*—A 3-page scenario described an American-Japanese joint venture, the "Fuji Printing Press Company," specializing in the manufacture and sale of printing presses under license from the American partner. Each partner was characterized as holding 50 percent of the equity, with equal cash contributions by both. The scenario was developed after consulting standard works on international joint ventures (Vernon & Wells, 1976; Friedmann & Beguin, 1971).

The joint venture was said to have been operating successfully for 3 years with about the same percentage of profits each year. The joint venture contract required that 35 percent of annual distributable income be paid out to each partner in equal annual dividends. Operations had been smooth and morale excellent. The two representatives of the partners, Mr. Kato and Mr. Adamson, were said to "have worked hard to make their relationship smooth and friendly."

The potential benefits of the joint venture were described for each partner. The Americans could receive profits and could penetrate Japanese markets. The Japanese also could gain profits and could gain access to American technology. Potential problems that could occur in the future were described. The Americans might not be forthcoming in transferring technology to the Japanese; the Japanese might use the new technology to develop the Japanese parent firm's technology to the detriment of the joint venture.

The nature of the dispute settlement section of the joint venture contract was described, as was the nature of a dispute arising at the end of the third year of operations. At this time Mr. Adamson was described as suddenly requesting that the percent of distributable income be raised from 35 percent to 70 percent, and Mr. Kato was described as disagreeing. Possible positive and negative reasons were listed for Adamson's request (the parent firm's need for cash or the parent's desire to retard the flow of retained earnings into technology development that might benefit the Japanese) and Kato's refusal (the parent firm's belief that more retained earnings are needed for market development or the parent firm's desire for rapid technology development which it could use to replace the need for the joint venture).

*Independent Variables*—Eight versions of the scenario were constructed in accord with the 2×2×2 factorial design. The president and vice-president were varied (Mr. Kato or Mr. Adamson), as was the dispute settlement clause in the joint venture contract. One version required conferral to resolve disputes. The other required "binding arbitration by a mutually agreed upon third party without mediation of any kind." Finally, the nature of Mr. Adamson's response to Mr. Kato's disagreement during the dispute was varied. In one version Mr. Adamson requests conferral; in the other he requests binding arbitration.

*Dependent Variable*—After reading the scenario the managers were asked to put themselves in the position of the representative of their nationality (Kato or Adamson) and then respond to 11 statements on a 7-point agree-disagree scale, describing the future dealings of one representative with the other. The 11-item test measured perceived future trust between the individual American and Japanese representatives. The test was a shortened, adapted version of Rotter's interpersonal trust scale (Rotter, 1967), modified by recent research (Kaplan, 1973; Corazzini, 1977). The following dimensions of trust, 10 in number, were described: sincerity, lack of caution, lack of suspicion, desire for close relationship, reliance, equality, expectancy, predictability, consistency, and general agreement. The eleventh statement directly mentioned the likelihood of future trust between the two representatives. Statement 1, for example, was, "Mr. Adamson (Kato) will act very sincerely in his future dealing with Mr. Kato (Adamson)." Because there appears to be a high degree of similarity in personality structure between Americans and Japanese (Kikuchi & Gordon, 1970), and because both nationalities tend to construe the behavior of others in much the same way (Bond, Nakazato, & Shiraishi, 1975), it was expected that both groups would define trust in the same manner.

*Other Measures*—The scenario was constructed to control for nonexperimental variables that could influence perceived future trust. Among the variables controlled in the description of the joint venture were: morale, structure of the venture, past smoothness of operations, past profitability, and past relationship between the partners and between the representatives. The questionnaire itself, however, recorded subject measures that also could influence perceived future trust. These were: age, education, work experience, and U.S.-Japanese joint venture experience. Subject attitudes were recorded on 7-point favorable (familiar)/unfavorable (unfamiliar) scales regarding: experiences with the other nationality; attitude towards the other nationality; and familiarity with U.S.-Japanese joint ventures, joint venture disputes, and U.S.-Japanese trade relationships.

*Translation*—The English versions of the scenarios and the questionnaire were translated into Japanese in accord with the standard blind translation method (Brislin, Lonner, & Thorndike, 1973). A Japanese first translated the test into Japanese, and then an American translated it back to English without reference to the original English. A committee consisting of the two translators and three Japanese then went over both versions and made revisions. Finally, one of the authors corrected spelling in the Japanese version and modified it to develop the proper level of formality.

## RESULTS

### Pilot Test

The English version was pretested on 38 international business students at the University of Washington to assess the reliability and content validity of the dependent measure. Reliability of the instrument was high (Chronbach's alpha = .89), and factor analysis indicated only one factor with an acceptable eigenvalue above 1, eigenvalue = 4.79, 74 percent of variance (Harman, 1967). This factor was identified as trust. Thus, the test measured trust and only trust.

### Randomization Check

Test versions were randomly assigned to both subject groups, and analyses of variance were performed to determine if there were any significant differences in (1) the age of the subjects and (2) in the joint venture experiences of the subjects among the cells for both groups. There were none, and thus the subjects were deemed to have been randomly assigned to treatments.

### Dependent Measure

The internal reliability of the 11-item dependent measure for the American sample was estimated to be .76 (Chronbach's alpha). For the Japanese sample it was .78.

Factor analysis of the American sample (principal factoring with iteration, orthogonal rotation) revealed only one factor with an eigenvalue above 1 (eigenvalue = 3.23, 64.6 percent of variance). Similar results were obtained for the Japanese sample. One factor with an eigenvalue above 1 was revealed (eigenvalue = 3.32, 60.3 percent of variance). Thus only one factor appeared for each sample.

Comparison of the American and Japanese managers' responses on the dependent measures yields some rather interesting similarities and differences. To begin with, the factor identified for both sets of responses was labeled as "trust" for two reasons. First, the measures were derived from prior theoretical and empirical studies of interpersonal trust. Thus the measures were supposed to measure trust and nothing else. Second, the last measure directly asked respondents about trust (Table 2). It was logical to label the factor on which this measure loaded highly as "trust." For these reasons the factor derived from statistical analysis was identified as trust.

Table 2 lists the trust factor loadings for the factor analysis of the 11-item interpersonal trust test. The significant dimensions of interpersonal trust are (all but the last are common to both groups):

—a belief that the other person will act sincerely in future dealings
—the desire to work hard in the future to establish a close relationship
—reliance on the other person in their future dealings
—the expectation that the future relationship with the other person will be good
—the belief that the future behavior of the other person will be consistent with his past behavior (American sample only)

Because none of the other factors identified had eigenvalues above 1, no attempt was made to name them. Thus the dimensions that did not load highly on trust were not considered to be parts of other factors but rather were viewed as nonsignificant elements of trust in this study.

TABLE 2
**Trust Factor Loadings for Interpersonal Trust Test: American and Japanese Subjects (After Rotation)**

| *Trust Dimension* | *American* | *Japanese* |
|---|---|---|
| 1. Sincerity[a] | .70 | .66 |
| 2. Lack of caution | .03 | .10 |
| 3. Lack of suspicion | .23 | -.02 |
| 4. Desire for close relationship[a] | .76 | .68 |
| 5. Reliance on other person[a] | .60 | .56 |
| 6. Belief in equality of power | .26 | .49 |
| 7. Expectancy of good relationship[a] | .76 | .85 |
| 8. Predictability of future behavior | -.10 | .05 |
| 9. Consistency of future behavior | .73 | .23 |
| 10. General agreement with other | .37 | .40 |
| 11. Trust in other[a,b] | .52 | .57 |
| Eigenvalue | 3.23 | 3.32 |
| Percent of variance | 64.60 | 60.30 |

[a] Dimensions of trust common to both American and Japanese managers.
[b] This dimension was employed to aid in the identification of the trust factor.

## TABLE 3
## Means of Perceived Future Trust for American and Japanese Samples[a]

| | *American (N=48)* | *Japanese (N=72)* |
|---|---|---|
| President—Mr. Kato | 44.44 | 39.51 |
| President—Mr. Adamson | 47.26 | 40.40 |
| Contract requires conferring to resolve disputes | 45.87 | 38.03 |
| Contract requires binding arbitration to end disputes | 45.72 | 41.76 |
| Dispute request from Mr. Adamson for conferral | 46.97 | 41.90 |
| Dispute request from Mr. Adamson for binding arbitration | 43.83 | 37.35 |

[a] The higher the score, the greater the perceived future trust.

The scores for the 11 items were added together to form an overall dependent measure of perceived future trust. None of the possible covariate measures (age, education, etc.) was significantly correlated with the dependent measure.

### American Sample

Table 3 contains the means for each variable and group in both samples. The higher the mean, the greater the perceived future trust between the two representatives. Analysis of variance revealed no significant main effects or interactions for any variable.

### Japanese Sample

Analysis of variance revealed no significant main effects at or below the conventional .05 level. However, there was a close to significant main effect for the nature of the dispute request variable, $F(1, 71)=3.409$, $p=.069$. The Japanese saw future trust as more likely to develop when the American joint venture partner requests conferral instead of binding arbitration to resolve disputes.

There also was a significant president–nature of contract interaction, $F(1, 71)=5.180$, $p=.026$. A series of one way analyses of variance revealed the following. When a Japanese was president, the Japanese managers had no significant preference for contracts requiring either conferral or binding arbitration. However, with an American as president, the Japanese saw future trust as developing better if contracts require binding arbitration instead of conferral, $M=35.65$ contract requires conferral, $M=44.89$ contract requires binding arbitration, $F(1, 34)=8.118$, $p=.0075$.

## DISCUSSION

Hypothesis 1, the Japanese belief that a conferral requirement in a joint venture contract is better than a binding arbitration requirement for building future trust, was not supported. In fact, the Japanese managers preferred a binding arbitration requirement when an American was in charge of operations.

Hypothesis 2, the Japanese belief in building future trust by resolving disputes as they come up through conferral rather than through binding arbitration, was supported.

It is of note that an ANOVA incorporating nationality revealed that the American managers perceived greater future trust in the venture than did the Japanese, no matter what the situation, $F(1, 119) = 8.18$, $p = .005$. The reasons for this greater American optimism may lie in the nature of the experimental scenario or, more important, may be due to differences in past joint venture experience on the part of the managers.

In comparison with American managers, who had no significant attitudes in this study regarding the development of trust in joint ventures, the Japanese managers showed a thoughtful and subtle concern for the means by which trust can be developed. In general, results showed that the belief that Japanese prefer communication as opposed to legal resolution to deal with disputes must be modified somewhat to include a statement regarding which nationality is in charge of operations. It appears that when Americans are in charge of operations in Japan, the Japanese are more likely to see trust developing through the contractual requirement for binding arbitration to settle disputes. However, the Japanese faith in mutual conferral to build future trust does emerge as the preferred method to resolve existing conflict, regardless of the nationality of the manager in control.

It has been noted that Japanese generally are thought to prefer flexibility in responding to unfolding problems (Henderson, 1975). In resolving conflicts this flexibility takes the form of conferring "in a spirit of honesty and trust" (Japan Trade Center, n.d., p. 3). This study supports these contentions but compels a more complex view of Japanese practice in terms of *avoiding* conflict before it occurs. With an American in charge of operations in Japan, the Japanese preference for flexible conferring gave way in this study to the more rigid approach of binding arbitration as the required method to resolve future conflicts so that trust is developed. This finding modifies earlier conclusions regarding Japanese preferences for conferral (Henderson, 1975; Ballon, 1978; Peterson & Shimada, 1978).

Further research is needed to explore why American operational control in Japan causes Japanese managers to abandon their traditional reliance on conferral. Could it be that the Japanese view conferral as a weaker conflict resolution method than binding arbitration in the sense that conflicts created by an American in control might be so great as to require the powerful resolution of third party intervention? Or is it that Japanese managers are beginning to model their behavior on American practice as the conventional—and thus perhaps desirable—method for negotiating differences in international business?

The literature cited above on Japanese versus American joint venture decision making and trust building behavior concerns itself with describing Japanese *responses* to such things as different goals, different languages, and different cultural values. Conferral as a response to conflict over those issues is a typical Japanese behavior. However, the present study also suggests that *anticipatory behavior*, designed to head off conflict before it occurs, will not involve conferral in every situation. Japanese managers apparently value binding arbitration to resolve disputes that may occur because an American controls day to day operations of a joint venture in Japan.

A comparison of what is and what is not important in building trust between American and Japanese joint venture partners provides singular insight into international-intercultural business behavior. Apparently both American and Japanese managers define trust quite similarly, and both seem to agree that the building of mutual trust is not influenced much by dimensions having to do with the business situation, such as the maintenance of a cautious, wary, business-like attitude towards the other. (Note the low factor loadings on dimensions 2 and 3 in Table 2.) Moreover, the low factor loadings on dimensions 6, 8, and 10 suggest that trust is not defined in terms of power inequality or unexpected changes in behavior or by the absence of general agreement on all issues.

Only on dimension 9, consistency, was there a difference in the weight that each group assigned. Both Japanese and American managers indicated that unpredictable future behavior would not have much effect on trust, but the American group rated future behavior consistent with past behavior to be an important part of trust. The Japanese did not. It seems that Americans can tolerate unexpected behavior only as long as it is based on (consistent with) past behavior and actions. The Japanese seem more willing to develop trust even in the face of unexpected, inconsistent behavior on the part of the other party.

Given the difference in cultural values in America and Japan regarding the individual's relationship to his experience, this finding is not surprising. Pascale (1978) describes the Japanese belief that the individual must accommodate himself to a continuously unfolding set of events; he must learn to accept the ambivalent behavior of others. Americans, however, have a lower tolerance for ambiguity. Their need to seek mastery of a situation compels them to seek mastery over nonambivalent events. In the case above, the American managers were unable to go as far as the Japanese managers in their willingness to build trust in the face of unpredictable, inconsistent—and thus ambivalent—behavior.

It can be concluded that both American and Japanese managers in the study define the deliberate development of a close personal relationship with the other group as crucial to the definition of mutual trust. Further, the responses of both groups suggest that future trust is not significantly defined by the presence of a general cautiousness and wariness in the relationship, by power inequality, by a lack of total agreement on all issues, or by unexpected behavior on the part of the other party. The only difference between the groups is that the American managers see nonambivalent behavior as important to trust and the Japanese managers do not.

This study has explored intercultural trust in joint ventures and international trade experience between American and Japanese managers. The study sought to determine if trust is related (1) to the way contracts are written regarding the settlement of disputes, (2) to the actual ways disputes are settled, and (3) to the position of the nationalities in the organization. Further, it was designed to determine whether American and Japanese managers define trust in similar ways. It was found that trust is related to the way in which conflicts are settled. It is not related to position alone or to the nature of the contract alone, but rather is related to some extent to both position and the nature of the contract acting together. Finally, it was found that both American and Japanese managers define trust in remarkably similar ways. Both emphasize the personal relationship dimensions of trust as more important than the situational dimensions.

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# *Research on Conflict-Handling Behavior: An Experimental Approach*

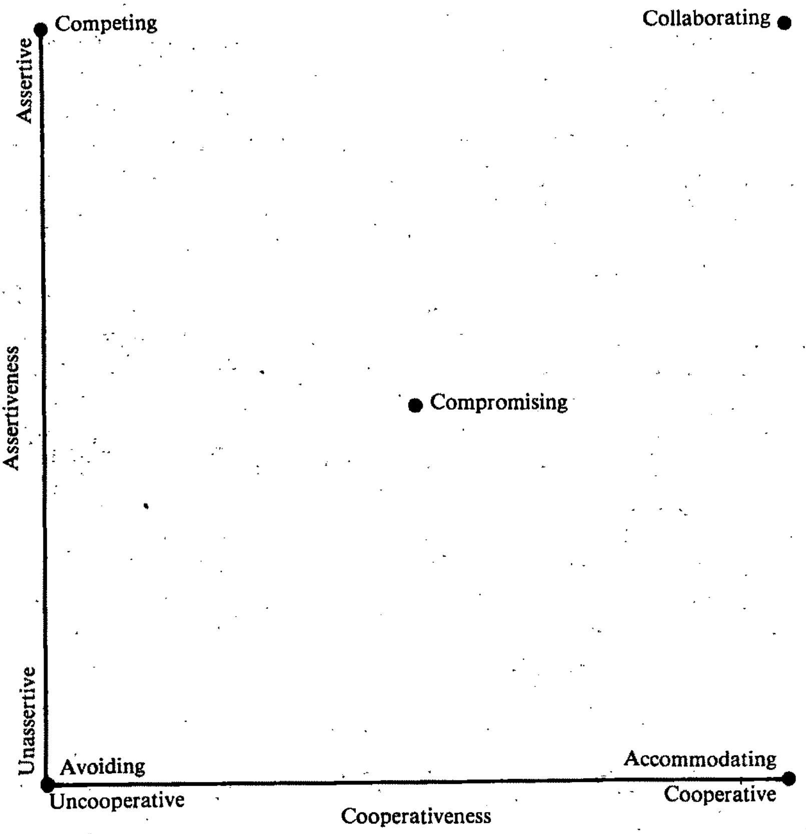
**RICHARD A. COSIER**
**THOMAS L. RUBLE**
**Indiana University**

*An experimental methodology for examining conflict-handling behaviors is based on a two dimensional model that identifies five modes for managing conflict. A study was conducted that illustrated the potential benefits of the methodology. The availability of five choices did result in some behaviors that would have been "hidden" in two-choice experimental games.*

Conflict, an inescapable feature of social life, has been the subject of extensive research. Unfortunately, much of the research has viewed conflict behavior as a choice between cooperation and competition. Research suggests, however, that this unidimensional, cooperative-competitive dichotomy may be inadequate as a model of conflict-handling behavior. For example, factor-analytic studies have shown that two dimensions of connotative meaning were discernible in semantic differential ratings of individuals and their conflict behavior (Kelley, Shure, Deutsch, Faucheux, Lanzetta, Moscovici, Nuttin, Rabbie, & Thibaut, 1970; Ruble & Cosier, 1980; Ruble & Thomas, 1976). Thus, concern over the limitations of the unidimensional model has stimulated the development of a two dimensional model for identifying different responses to a conflict.

A two dimensional model of conflict behavior is presented in Figure 1. This model originated with the work of Blake and Mouton (1964) and has been developed and extended by Thomas (1976, 1979). The model identifies two conceptually independent dimensions of interpersonal behavior: (1) *assertiveness*, defined as behavior intended to satisfy one's own concerns, and (2) *cooperativeness*, defined as behavior intended to satisfy another's concerns. The dimensions combine to identify five conflict-handling modes: *avoiding* (unassertive, uncooperative); *competing* (assertive, uncooperative); *accommodating* (unassertive, cooperative); *collaborating* (assertive, cooperative); and *compromising* (intermediate in both assertiveness and cooperativeness).

**FIGURE 1**
**Two Dimensional Model of Conflict Behavior**



Compared to the unidimensional, cooperative-competitive dichotomy, the two dimensional model appears to provide some major advantages to the conflict researcher. First, from a descriptive point of view, the two dimensional model seems to be more representative of the way conflict behavior is perceived by parties to conflict. Semantic differential research (Osgood, Suci, & Tannenbaum, 1957) has indicated that individuals tend to apply two primary dimensions of connotative meaning in their ratings of interpersonal behavior: evaluative (good versus bad) and dynamism (strong and active versus weak and passive). These two dimensions also have been found in conflict research (Kelley et al., 1970; Ruble & Cosier, 1980; Ruble & Thomas, 1976).

Second, from a normative point of view, the two dimensional model identifies a variety of cooperative alternatives to competition, including collaboration. Collaboration is seen as an approach to conflict that transcends zero-sum assumptions (Thomas, 1976) and is recommended as a means of resolving conflict through problem solving rather than through power struggles (Filley, 1978). Third, the two dimensional model has been used to study conflict in a variety of organizational settings (Burke, 1970; Jamieson & Thomas, 1974; Lawrence & Lorsch, 1967; Renwick, 1975a, 1975b; Thomas & Walton, 1971).

Applying the two dimensional model to research in organizational settings may represent progress toward more effective management of conflict. However, the results of recent studies in organizational settings must be interpreted with caution. Specifically, the results may be an artifact of the social desirability biases of the measurement instruments (Thomas & Kilmann, 1975). This is particularly likely because the empirical research in organizations has relied heavily on self-report questionnaire data. Moreover, other extraneous variables may affect self-ratings of conflict behavior, operating much like a halo effect (Thomas & Kilmann, 1975).

To overcome some of the limitations of recent research, it would seem useful to adapt the two dimensional model to a more controlled setting. The laboratory offers some distinct advantages to the conflict researcher: (1) the possibility of objective, behavioral measures of conflict-handling behavior; (2) greater control over the variables of interest as well as extraneous variables; and (3) a "safer" setting for examining behavior (conflict) that may have socially destructive or personally injurious effects in real life settings. Moreover, adapting the two dimensional model to an experimental setting would provide an opportunity for a link between field studies and laboratory research, a condition sorely lacking in the dichotomous approach to classifying conflict behavior.

## AN EXPERIMENTAL GAME

A game is proposed that adapts the two dimensional model to an experimental setting. This game meets three major design considerations. First, the game allows the participants five behavioral options that represent the five conflict-handling modes identified in the two dimensional model. Because this approach is based on the five conflict-handling modes, it will be referred to as the mode game (MG). Second, the MG was designed to follow the matrix format. That is, the MG retains the basic idea of a two-player interactive game. Third, the MG involves both substantive and process components. The MG is based on the assumption that conflict-handling is an interpersonal process that occurs in a context of solving or resolving substantive issues. Thus, a series of questions was developed to provide the substantive context in which an individual could choose to compete with, cooperate with, or avoid another person.

### The Five Options

The MG allows individual choices that correspond to the five conflict-handling modes (Table 1). The MG recognizes that the alternative to competition is not simply cooperation and vice versa. Rather, cooperation is assumed to exist in several varieties, and avoidance is a viable option.

### TABLE 1
### The Correspondence Between Conflict-Handling Modes and Options Offered in the MG

| *Conflict-Handling Mode* | *MG Option* | *Explanation of MG Option* |
|---|---|---|
| Avoiding | NP (no play) | This choice means that you do not want to participate. |
| Competing | SI (self-interest) | This choice means that you want to work for yourself against the other person. |
| Compromising | J1 (joint #1) | This choice means that you want to split the payoff evenly between yourself and the other person. |
| Accommodating | J2 (joint #2) | This choice means that you want to let the other person make the decision that determines your payoff. |
| Collaborating | J3 (joint #3) | This choice means that you wish to work with the other person in determining the payoffs. |

## The MG Matrix Format

In order for individuals to have a better understanding of their options, the MG is presented in matrix form. The matrix provides the means for presenting a probabilistic outcome space and clearly illustrates the interactive nature of the decision making setting (Table 2).

### TABLE 2
### The MG Matrix
### (With Sample Payoffs)

*First, if either one of you chooses NP (no play) on a given trial, you both gain 2 cents and the trial is over.*

*If you both choose to play, the possible combinations and payoffs in cents are as follows:*

| *Your Choices* | *Other's Choices* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *SI* | | *J1* | | *J2* | | *J3* | |
| SI | Answer to question counts for self | | | | | | | |
| | Winner | +8 | You | +8 | You | +8 | You | +8 |
| | Loser | 0 | Other | 0 | Other | 0 | Other | 0 |
| | NOTE: see below | | | | | | | |
| J1 | You | 0 | You | +4 | You | +4 | You | +4 |
| | Other | +8 | Other | +4 | Other | +4 | Other | +4 |
| J2 | | | | | | | Other's answer to the question counts | |
| | You | 0 | You | +4 | You | +4 | Right: | both +8 |
| | Other | +8 | Other | +4 | Other | +4 | Wrong: | both 0 |
| J3 | | | | | Your answer to the question counts | | Joint answers to the question count | |
| | You | 0 | You | +4 | Right: | both +8 | Right: | both +10 |
| | Other | +8 | Other | +4 | Wrong: | both 0 | Wrong: | both −2 |

NOTE: If you both choose SI and both answer correctly, a coin-flip will determine the winner. If you both answer incorrectly, you both gain nothing.

## The Questions: A Context for Conflict Behavior

In most experimental games, the outcomes of the parties are determined automatically by the combination of their choices. In the Prisoner's Dilemma Game (PDG), for example, mutual competition results in a loss for both parties and mutual cooperation results in a gain for both parties. However, the automatic determination of payoffs does not provide a very close approximation to real life conflict outcomes. In real life, the choice of a conflict-handling mode probably would serve as a starting point for the conflict resolution process. As the process unfolds, the relative power and/or abilities of the parties would become factors in determining the outcomes. In addition, factors extraneous to the interpersonal process may provide elements of uncertainty that affect the parties. In the MG, a series of questions provides a basis for studying some of the complexities of the conflict-handling process. As shown in the matrix (Table 2), if an individual chooses to compete (SI) or collaborate (J3), the payoff may be contingent upon his ability to answer a question. If both individuals select SI, a win-lose contest occurs that revolves around the question. That is, the parties have to resolve an issue (the question) to determine the outcomes. When only one of the decision makers gets the correct answer, that person is the winner and receives a positive payoff. The loser receives nothing. When both parties answer incorrectly, both gain nothing. When both parties answer correctly, a coin-flip determines the winner. The coin-flip introduces an element of uncertainty in the deadlocked situation. This element of chance may be analogous to the uncertainty of a binding arbitration clause in a collective bargaining agreement and may affect the choice of a conflict-handling mode. In the MG this factor eventually may be manipulated as an explicit part of the research design.

When both parties choose to collaborate (J3), they work jointly on a question. If verbal communication were allowed, they would simply negotiate a joint response. However, in the current version of the game, verbal communication is not allowed. In this case, the decision makers answer the question separately. At the same time, they indicate their level of confidence in their answer. The use of the confidence level provides an opportunity for the parties to coordinate their responses in order to maximize potential gain. The opportunity for coordination is an important part of collaboration. When both are correct, both receive the same positive payoff. When both are incorrect, both receive a negative payoff. When the decision makers disagree, the answer that has the highest level of confidence is used as the joint response. (It is possible that both parties will disagree and report the same level of confidence. In this case, a coin-flip determines which answer is taken as the joint response.)

A question also is involved when one person chooses to collaborate (J3) and the other person accommodates (J2). In this case, the answer from the person choosing J3 determines a joint payoff. If the response is correct, both parties receive the same positive payoff. If the answer is incorrect, both receive nothing. The logic behind this joint payoff is that the accommodator is willing to let the other person determine the outcome. In contrast, the collaborator has shown the desire to play an active role in determining the outcome.

In a number of instances the ability to answer the questions may be an important factor in determining outcomes. The format of the MG provides a researcher an opportunity to manipulate and study the effects of this factor on the conflict resolution process. The current version of the MG attempts to minimize the effects of this factor by utilizing relatively difficult questions with only two possible answers. Ability should have minimum impact for either totally random or totally predictable questions. That is, two-choice questions that can be answered with only 50 percent accuracy or 100 percent accuracy should minimize ability differences. In order to present decision makers with challenging issues to resolve, the very difficult or nearly random option for minimizing ability differences was chosen. Results show that subjects in this study did only a little better than chance—they picked the correct response 58½ percent of the time.

Several outcomes do not involve a question. First, if one player does not want to play on a given trial (NP), that decision controls the outcomes regardless of the other's choice. Second, the competitor (SI) may take advantage of a cooperator (J1, J2, & J3). Third, a combination of choices that involves a compromise or mutual accommodation results in a simple division of payoffs.

The payoffs can be set to accomplish a variety of objectives. The sample payoffs in Table 2 were created in order to maintain the basic "dilemma" present in other mixed motive games. A cooperator leaves himself vulnerable to exploitation by a competitor. However, the highest payoff is attained only by collaboration. In addition, when individuals elect to play the game, the only way that joint payoffs occur is under some type of mutual cooperation.

## METHOD

### Subjects

Participating in a study that involved the MG were 100 male upper level undergraduate business majors. Subjects signed up to participate in a two-person decision game in order to fulfill a course requirement.

### Physical Setting

With one exception, six subjects participated at each session (one group of four participated to balance out the conditions). Six desks were arranged in a large room such that no desk was within 15 to 20 feet of another. The desks had partitions in order to block the players' views of one another. Before the players were assigned to a desk, they waited together in the large room. This brief waiting period was designed to convey the idea that real people were going to be involved in the session.

## Procedure

After the subjects were assigned to a desk, each was given an informed consent document and a 4-page set of written instructions. Details of the procedures are available from the authors. The instructions may be summarized as follows:

1. You and another person will make simultaneous decisions over a series of trials.
2. On each trial, the combination of choices will result in a payoff. The money is real and you may earn up to $3.
3. You must make your decisions without consulting the other person.

The instructions also explained their five options (Table 1) and presented the payoff matrix (Table 2).

In order to ensure that the subjects understood their options and how the payoff matrix was used, they were given a short quiz. The quiz presented six combinations of choices (e.g., SI-J2, NP-SI) and asked the subjects to indicate the payoffs to themselves and the other person. Sample questions also were provided. Subjects were told that they would be answering questions in four categories: (1) sports, (2) college nicknames, (3) movie and television trivia, and (4) general knowledge. The questions were worded with two possible answers (A or B) and required the subjects to report their level of confidence in their responses (from 50 percent—just a guess, to 100 percent—certain). The questions were designed to be relatively difficult, yet not impossible. This was intended to minimize the potential impact of ability differences. When the subjects had completed the pre-game quiz, an experimenter looked over the responses and explained any incorrect answers. The first game was started after the experimenter felt confident that the subjects understood the instructions.

Each game consisted of 10 trials. On each trial, the subject answered a question, indicated the level of confidence in the answer, and selected one of the five options. Feedback on the outcomes was provided before starting the next trial. Each subject was informed of the other party's choice, and the resulting payoffs of both parties were provided.

### Game 1: The Subject versus a Programmed Strategy

Unknown to the subjects, in the first game they were playing with a "programmed other." Subjects were randomly assigned to one of five conditions reflecting different programmed strategies. (To implement the programmed strategies, the other player answered questions with 50 percent accuracy and a 70 percent level of confidence. A coin-flip was used to settle ties in a SI-SI choice situation and to determine the winner in a J3-J3 choice situation in which both parties disagreed with 70 percent levels of confidence. In order to prevent an improbable "string" of heads or tails, unknown to the subjects, the researchers allowed a maximum of two heads or tails in a row.) The NP and SI programmed others followed "pure" strategies in that they consistently avoided (100 percent NP) or competed (100 percent SI). The "J" others exhibited "purely cooperative" strategies but, to gain credibility, they were programmed to select J1, J2, or J3 on only 80 percent of the trials. (A pilot test indicated that subjects were suspicious when they faced a 100 percent consistent J1, J2, or J3 strategy. Surprisingly, they were not suspicious against a 100 percent NP or SI strategy.) The "J" others selected a "nondominant" J choice on the fourth and eighth trials (e.g., J1, J1, J1, J2, J1, J1, J1, J3, J1, J1).

After the subjects completed the game, each was given a rating form and asked to rate the other player on a series of semantic differential items. The semantic differential form used in the present study contained 10 items that were used in a previous study of the two dimensional model (Ruble & Thomas, 1976).

### Games 2 and 3: Interaction Between Real Players

Following the first game with a programmed other, the subjects played two more games. Games 2 and 3 were played with other real subjects following the same rules and procedures as game 1.

## RESULTS

Two types of data were collected: (1) behavioral measures and (2) semantic differential ratings. The behavioral measures are analyzed to answer the general question of whether all five modes would be used. That is, if given five choices, would the subjects use all five options or would they merely concentrate on a pair of choices (i.e., competition versus collaboration)? In addition, the behavioral measures allow a determination of whether subjects behave in the same way as they "learn" their partners actions in game 1. The semantic differential ratings are analyzed to determine whether perceptions of the other parties were consistent with the two dimensional model of conflict-handling behavior. That is, would the subjects' perceptions differentiate among behaviors that might be considered as equivalent in other experimental games (i.e., collaboration versus accommodation)?

### Behavioral Measures: Use of the Five Modes in Game 1

As shown in Table 3, all five modes were used in game 1. It appears that the availability of five choices did result in some behaviors that would have been forced into two choices had a dichotomous approach been utilized instead of the MG. Post hoc tests were computed to determine whether the strategy of the programmed other affected the subjects'

## TABLE 3
## Use of Choice Options During Interaction with the Programmed Other

| *Programmed Other* | *Percent Use of NP* | *Percent Use of SI* | *Percent Use of J1* | *Percent Use of J2* | *Percent Use of J3* |
|---|---|---|---|---|---|
| Avoiding (NP) | 6.5 | 43.5 | 13.0 | 12.5 | 24.5 |
| Competing (SI) | 9.0 | 64.5 | 3.0 | 8.0 | 15.5 |
| Compromising (J1) | 0.0 | 34.5 | 23.0 | 15.0 | 27.5 |
| Accommodating (J2) | 2.0 | 23.5 | 18.5 | 28.5 | 27.5 |
| Collaborating (J3) | .5 | 26.0 | 9.0 | 15.5 | 49.0 |
| Overall | 3.6 | 38.4 | 13.3 | 15.9 | 28.8 |

conflict behavior. This analysis provides some information on the conditions under which different conflict-handling modes are chosen.

*Avoiding (NP)*—Although the NP choice was used only between 3 and 4 percent of the time, it generally was used more against "noncooperative" than "cooperative" programmed others. The selection of the NP option differed depending on the other player ($F=6.31, p<.001$). (All ANOVAs were performed on ARCSIN transformed proportions.) More specifically, Newman-Keuls pairwise comparisons revealed that the NP option was used more when interacting with the SI other than when interacting with the J1 or J3 other ($p<.01$), or with the J2 other ($p<.05$).

*Competing (SI)*—The selection of the SI option depended on the other player's behavior ($F=5.21, p<.001$). The SI option was selected more often against an SI other than against a J2 or J3 other ($p<.01$), or against a J1 other ($p<.05$). Thus, the primary use of SI seems to be one of matching the other instead of exploitation. However, some subjects did take advantage of a generally cooperative counterpart. Of all options used during interaction with the J1 other, SI was used over one third of the time. Subjects participating with J2 or J3 counterparts selected SI roughly one fourth of the time. It appears the subjects were more willing to take advantage of a cooperative other who desired to compromise than one who wished to collaborate or accommodate.

It may also be that the SI choice was selected to show displeasure with another who refused to play. When facing an NP counterpart, the SI option was selected nearly one half of the time, or nearly seven times more frequently than was the NP choice.

*Compromising (J1)*—As was the case for the previously discussed options, the use of J1 varied according to the other's choices ($F=4.44, p<.002$). The J1 option was seldom used against an SI other or a J3 other. Subjects matched a J1 other more than they picked J1 against an SI or J3 programmed player ($p<.01$ and $p<.05$, respectively). In addition, the J1 choice was used more often with a J2 other than with an SI other ($p<.05$).

*Accommodating (J2)*—The use of the accommodation choice (J2) was most frequent when the other player was also accommodating. Selection of the J2 option depended on the strategy of the programmed other ($F=3.13, p<.02$). The subjects were more willing to accommodate with the J2 other than with the SI other ($p<.01$), or with the NP and J1 others ($p<.05$).

*Collaborating (J3)*—The collaboration option (J3) was selected nearly one half of the time when the other player was also a collaborator. The effect of the other player on the use of J3 was significant ($F=3.76, p<.01$). Specifically the J3 option was used more with a J3 other than with the SI other ($p<.01$), or than with the NP and J1 others ($p<.05$). Overall, this choice was picked just under 30 percent of the time.

### Behavioral Measures: Effects of Learning the Partner's Actions

In order to see if subjects behaved differently when they became familiar with the partner's choices, the 10 choices in game 1 were broken into first and second half groupings. For each experimental condition, nonparametric contingency tests were used to examine the choices made during the first and second halves of game 1. In the SI and J2 conditions the subject's choices did depend on whether they were making first half or second half decisions ($\chi^2=18.10, p<.005$ for SI; $\chi^2=9.96, p<.05$ for J2). In the SI condition the subjects' behavior shifted from the J3 choice to the SI choice. In the J2 condition there was a shift from the J1 choice to the J2 choice.

### Behavioral Measures: Use of the Five Modes in Games 2 and 3

As in game 1, all five modes were used in games 2 and 3 (Table 4). In game 2 there was a tendency to use SI less than in game 1, and J3 was used more than in game 1. Choices other than SI and J3 were selected approximately one fourth of the time. In game 3 the use of J3 increased, largely at the expense of the SI option. Again, roughly one fourth of the choices were other than SI and J3. In both games 2 and 3, however, the NP choice was used sparingly.

**TABLE 4**
**Use of Choice Options During Games 2 and 3**

| *Mode* | *Percent Used in Game 2* | *Percent Used in Game 3* |
|---|---|---|
| Avoiding (NP) | 2.2 | 3.5 |
| Competing (SI) | 35.3 | 27.4 |
| Compromising (J1) | 9.4 | 6.3 |
| Accommodating (J2) | 14.3 | 12.3 |
| Collaborating (J3) | 38.8 | 50.6 |

The continued use of more than two choices in games 2 and 3 further illustrates the limitations of a two-choice paradigm. The need for more than a dichotomous set of options seems clear. The five behavioral options offered in the MG continued to be used over three games.

## TABLE 5
## Summary of Factor Loadings of Semantic Differential Items for Game 1

| *Adjective Pairs* | *Factors*<br>*Evaluative* | <br>*Dynamism* |
|---|---|---|
| Hostile-friendly | .82 | −.28 |
| Hard-soft | .80 | .12 |
| Deceptive-open | .49 | .53 |
| Dishonest-honest | .47 | .61 |
| Weak-strong | .07 | .62 |
| Unfair-fair | .70 | −.45 |
| Passive-active | .21 | .81 |
| Greedy-not greedy | .73 | .25 |
| Ineffective-effective | −.17 | .74 |
| Stubborn-desire to give and take | .74 | −.07 |
| Percent of variance | 42.6 | 25.4 |

### Perceptions of Programmed Others: Game 1

The semantic differential ratings of the programmed others were factor analyzed using a Varimax orthogonal rotation. This analysis yielded two factors that accounted for 68 percent of the total variance in the items. The items, factors, and factor loadings are presented in Table 5. Factor I was identified as an evaluative factor and factor II as a dynamism factor. The factors and item loadings are very similar to the results obtained by Ruble and Thomas (1976). Thus, the present study adds further support to the contention that individuals perceive parties in a conflict situation in terms of two primary dimensions rather than as a single, dichotomous dimension.

The results of the factor analysis were used to construct summary ratings of the programmed other. Scale scores were computed for the evaluative and dynamism factors by adding the ratings of the items that comprised the factors. The items defining the evaluative factor were easy to select: hostile-friendly, hard-soft, unfair-fair, greedy-not greedy, and stubborn-desire to give and take. All five of the items defining the evaluative factor had factor loadings over .70. Unfortunately, the items defining the dynamism scale were not as easy to select. Two items with loadings over .70 were clearly appropriate: passive-active and ineffective-effective. A third item, weak-strong, had a high loading on dynamism (over .60) and a negligible loading on the evaluative factor (.07). These three items were used to construct the dynamism scale scores. Two other items, deceptive-open and dishonest-honest, loaded above .50 on dynamism but were not included in constructing the dynamism score. The two excluded items also had high loadings on the evaluative factor (.49 and .47) and thus were not clearly associated with just the dynamism factor. To ensure that the choice/exclusion of items did not have a substantial effect on the results of the present analysis, an additional analysis was performed with the two items included in the scale scores. The pattern of results remained the same. One minor difference in the supplemental analysis was the failure of a post hoc test to reach significance. This difference will be noted later.

Coefficient alphas were computed in order to assess the reliabilities of the scale scores. The reliabilities were .86 for the 5-item evaluative scale and .78 for the 3-item dynamism scale.

The ratings of the programmed others on the evaluative and dynamism scales are presented in Table 6. Analyses of variance indicated that the conflict-handling modes of the programmed others were rated differently on both the evaluative dimension ($F = 39.38$, $p < .001$) and the dynamism dimension ($F = 12.11$, $p < .001$).

**TABLE 6**
**Mean Ratings of the Programmed Others**

| | *Programmed Others' Conflict-Handling Modes* | | | | | |
|---|---|---|---|---|---|---|
| *Factor* | *Avoiding (NP)* | *Competing (SI)* | *Compromising (J1)* | *Accommodating (J2)* | *Collaborating (J3)* | *Overall Mean* |
| Evaluative | 3.76 | 2.62 | 5.58 | 5.39 | 5.39 | 4.55 |
| Dynamism | 2.27 | 4.37 | 3.25 | 3.50 | 4.60 | 3.60 |

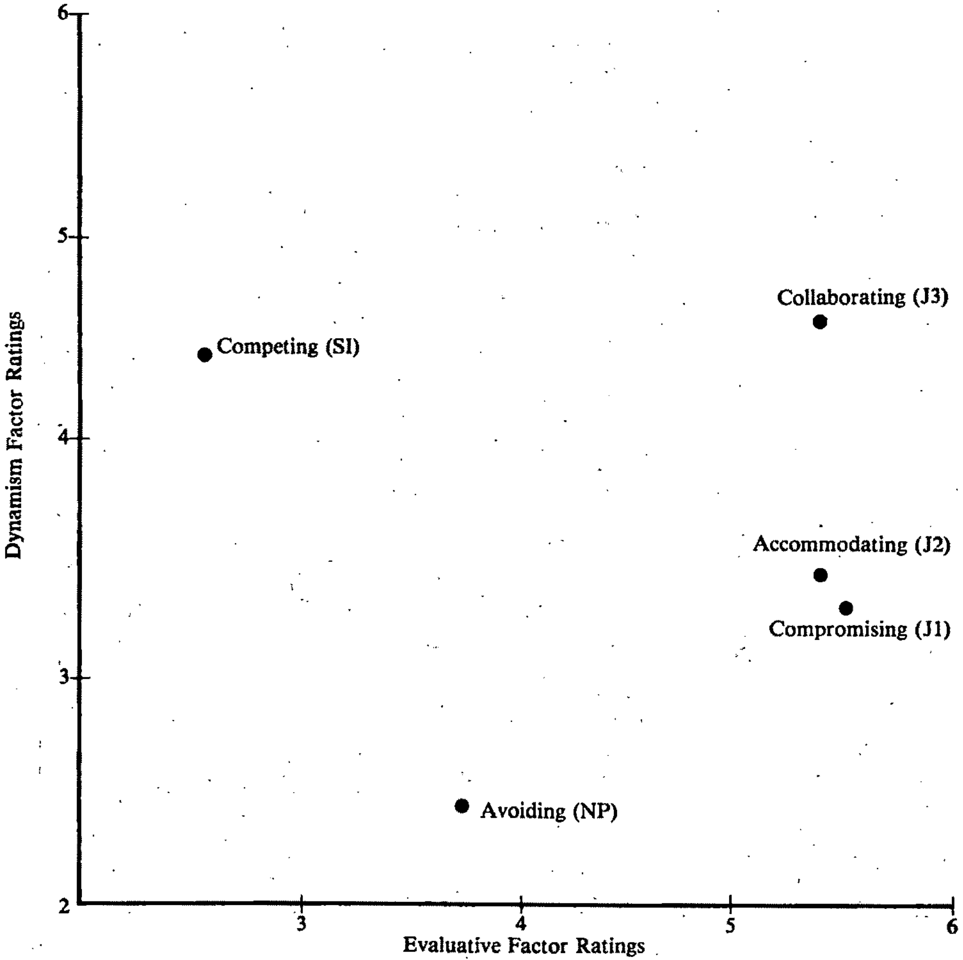
*Evaluative Ratings*—Newman-Keuls post hoc tests of the evaluative ratings indicated that the SI other was rated lower than the NP other ($p < .01$) and the three "J" others ($p < .01$ for all comparisons). The NP other was also rated lower than the three "J" others ($p < .01$ for all comparisons). The ratings of the three "J" others did not differ significantly. These results essentially replicate the findings of Ruble and Thomas (1976).

*Dynamism Ratings*—Newman-Keuls tests of the dynamism ratings indicated three groupings: (1) the NP other, (2) the J1 and J2 others, and (3) the SI and J3 others. The NP other was rated lower than the J1 ($p < .05$) and J2 ($p < .01$) others and lower than the SI and J3 others ($p < .01$). The J1 and J2 others were rated lower than the SI ($p < .05$) and J3 ($p < .01$ for J1, $p < .05$ for J2) others. With the exception of the J2 other, these results also are very similar to the findings of Ruble and Thomas (1976). In the present study, however, J2 was perceived as more dynamic than in the earlier study.

In the additional analysis of the dynamism ratings, the difference between the SI other and the J1-J2 others did not reach the .05 level of significance. The failure to reach significance in this case was attributed to the high loading of the additional items on the evaluative scale, thus confounding the two dimensions in the supplementary analysis.

*Graphical Representation of the Ratings*—The mean ratings of the programmed others are plotted in Figure 2. In general, the location of the modes is consistent with the expectations of the two dimensional model (see Figure 1). Two potential exceptions are J1 and J2. The J1 other was rated higher on the evaluative dimension than expected, and the J2 other

FIGURE 2
Mean Evaluative and Dynamism Ratings of Conflict-Handling Modes



was rated higher on dynamism than expected. It should be noted, however, that the two uncooperative modes, SI and NP, were clearly perceived as different and J3 was clearly seen as a different type of behavior than the other cooperative modes, J1 and J2. Thus, the semantic differential ratings indicate that subjects discriminate among types of behaviors that are considered equivalent in two-choice games.

### Perceptions of Others in Games 2 and 3

Because the behavior of the other person was not controlled (programmed) in games 2 and 3, the ratings cannot be analyzed as was done for game 1. However, factor analysis was done for the semantic differential ratings for both games to see if the two dimensions of meaning were still operating for the subjects. (Results of the factor analyses are available from the authors.) Again, two dimensions emerged for both games. These results, obtained from ratings of "real players," tend to support the previous results obtained from ratings of programmed others. In both cases, subjects used two dimensions of meaning in rating the conflict-handling behavior of another player.

## DISCUSSION

The MG was developed to: (1) investigate conflict-handling behavior from a model-based perspective and (2) overcome some of the limitations inherent in two-choice games. The MG includes: (1) five choice options; (2) substantive and process components to help clarify the implications of the choices; and (3) the potential to produce results of interest to researchers using a variety of paradigms and to practitioners interested in negotiation and conflict issues. The MG is intended to maintain some of the benefits of the experimental games and, at the same time, improve the ability to generalize results and test theory.

It is hoped that the MG concept provides a vehicle to advance conflict research. There is now, certainly, sufficient evidence to conclude that people do not just cooperate or compete. Results from the MG study clearly show choices and perceptions that involve more than a unidimensional, cooperation-competition dichotomy.

The results of this study, furthermore, suggest a reexamination of some of the findings from two-choice studies. For example, PDG research has found that subjects tend to be competitive (or noncooperative) roughly 67 percent of the time (Nemeth, 1972). If generalized, this has far-reaching implications. In contrast, this study found that when presented with five options, subjects compete only roughly 33 percent of the time. In addition, between games 2 and 3, there was a definite movement toward collaboration. This movement may reflect learning the other's pattern of behavior.

The PDG evidence seldom reveals reciprocal cooperative behaviors. This finding seems to contradict a body of evidence in social psychology (Berscheid & Walster, 1969; Gouldner, 1960). Nemeth believes that "the lack of reciprocity is due to variables intrinsic to the paradigm, the same variables that may account for other apparently irrational behaviors" (1972, p. 214). The results in this study illustrate frequent reciprocal choices. In all games there appeared to be a tendency to reciprocate noncooperative and cooperative choices. In game 1, there were two experimental conditions that showed a shift toward reciprocity. Several subjects interacting with an accommodating partner shifted from a compromise to an accommodating mode. In addition, there was a shift toward reciprocity of noncooperative behavior. When faced with a competitor, many subjects began using the collaborative option, but shifted to the competitive choice when they learned the strategy of their partner. The rationale for this shift is possibly one of self-defense against exploitation. In game 3 there seemed to be a high level of reciprocal collaboration. This finding is compatible with other research on conflict-handling modes, which found a tendency to reciprocate collaboration (Renwick, 1975b; Ruble, 1973; Thomas, 1971).

As in any research endeavor, there are possible limits to generalizability in this study. For example, in the present study the stakes were rather low ($3). Thomas (1976) indicated that the stakes should influence conflict-handling behavior. As previously noted, the nature of the questions and the degree of uncertainty also influence the outcomes and, hence, may affect the generalizability. However, the MG format is intended as a flexible approach. It is hoped that the MG may provide a foundation from which researchers can build. Payoffs (the stakes), the context (the questions), the degree of uncertainty, and the interface between players can all be varied to suit the researcher's needs.

Several MG applications would be of benefit in future studies. First, the propensity to choose modes when face-to-face interaction or verbal communications are allowed could be examined. Although these procedures may reduce experimental control, the generalizability of the results may be greatly enhanced. Second, if a stooge was used, a "split strategy" could be examined. For example, the stooge could be programmed as a "reformed sinner" by assigning five SI choices followed by five J choices. Third, differences in one's ability to answer the questions may influence the choice of conflict-handling modes. This factor could be examined systematically through appropriate pretest measures. Finally, another study could involve sequential instead of simultaneous decisions. An initial J choice would cause one to be extremely vulnerable to "exploitation" by a competitor. However, there are many conflict situations that are serial in nature.

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# *Pre- and Post-Intervention Effects of Conventional Versus Final Offer Arbitration*[1]

**FREDERICK A. STARKE**
**WILLIAM W. NOTZ**
**University of Manitoba**

*This study investigated the relative impact of final offer (FOA) and conventional (CA) arbitration on bargainers' pre- and post-intervention attitudes and behavior over two rounds of bargaining. Among other results, it was found that in both rounds, subjects anticipating FOA had lower aspirations prior to bargaining and were closer to agreement at the conclusion of bargaining than were subjects anticipating CA.*

Conflict between groups and individuals is a readily observable characteristic of modern society. Conflict can be seen in labor-management relations, divorce court proceedings, United Nations debates, and many other circumstances. Conflict can be destructive if not properly managed, and recently there has been a great deal of interest in techniques to facilitate conflict resolution. Arbitration is one widely used approach. When the parties in a dispute cannot reach an agreement on their own, an impartial third party imposes a binding solution on them.

Although several writers (Bairstow, 1975; Bigoness, 1976; Cullen, 1968; Kochan & Baderschneider, 1978; Taylor, 1948) feel that for interest disputes a negotiated settlement is more desirable than one imposed by a third party, there has been a trend toward increasing use of arbitration in both labor-management conflicts and in others (Anderson & Kochan, 1977; Bonn, 1972; Kochan & Baderschneider, 1978; Mentschikoff, 1952; Simkin, 1971). Proponents argue that arbitration allows parties in the dispute (as well as those indirectly affected by it) to avoid the costs of a protracted conflict. The arbitrator generally achieves this by imposing a compromise decision on the parties, giving each side some of its demands.

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Unfortunately, such a compromise decision rule has at least four negative aspects (Notz & Starke, 1978). First, neither party may be satisfied with the outcome that is imposed. This is particularly true when the parties are far apart during bargaining. In this circumstance, a compromise settlement is far away from either party's last offer to the arbitrator. Second, the expectation that the arbitrator will apply a compromise decision rule may lead to intransigence during bargaining. This "chilling effect" (Anderson & Kochan, 1977; Kochan & Baderschneider, 1978; Long & Feuille, 1974) occurs because opponents take extreme positions during bargaining in an attempt to offset the effects of the expected arbitrator's compromise. Third, over time the disputing parties may become dependent on arbitration to settle their differences. This "narcotic effect" (Wirtz, 1963) occurs if either one or both of the parties in the dispute feels that more can be obtained from the arbitrator than from a negotiated settlement. Finally, because they have little control over the arbitrator and the decision rule that is applied, the parties in the dispute may feel a decreased responsibility for bargaining outcomes.

Although these negative features of conventional interest arbitration (CA) have led some writers to reject binding third party interventions altogether, an alternate form of third party involvement—final offer arbitration (FOA)—has been proposed to resolve the difficulties with conventional arbitration. When this system is used, the parties are told prior to negotiations that if they cannot reach agreement on their own, each side will be required to submit its "final offer" to the arbitrator. The arbitrator then will choose the offer of one side or the other, the one the arbitrator feels is the more reasonable. This conveys to the parties that a compromise decision rule will not be used and that failure to reach agreement may impose a severe cost.

The efficacy of FOA is controversial. Supporters (Bellman & Graham, 1974; Feuille, 1975; Holden, 1977; Scott, 1973; Stevens, 1966) argue that FOA increases the pressure on the parties to take realistic positions and to settle the dispute themselves. Opponents (Clawson, 1973; Feigenbaum, 1975; Foster, 1974; Swimmer, 1975; Zack, 1974) claim that the process is too Draconian, that it is a gimmick, that it encourages gamesmanship, that it is inflexible, and that the arbitrator may have to choose between two unreasonable offers.

These contradictory claims about CA and FOA can be dealt with by analyzing whether they occur before or after an arbitrator has imposed a settlement. The pre-intervention effects of the two forms of arbitration include their impact on the bargainers' (1) desire to fashion their own agreement, (2) aspiration levels, and (3) willingness to make concessions during negotiations. The post-intervention effects of arbitration involve the bargainers' (1) monetary outcomes, (2) satisfaction with the arbitrator's decision, (3) commitment, and (4) propensity to use the arbitration process again.

Two general observations can be made about these pre- and post-intervention effects. First, bargainers have considerable control of the situation in the pre-intervention stage of the bargaining process but very little control in the post-intervention stage. (For purposes of this research, the pre-intervention stage is assumed to end after the parties have submitted their documentation to the arbitrator for his consideration. The post-intervention stage begins when the negotiators receive the arbitrator's decision.) Second, the pre- and post-effects are not independent (for example, the commitment of bargainers to an arbitrator's decision presumably will depend, in part, on how intransigent or conciliatory the bargainers were prior to the arbitrator's intervention).

## CONVENTIONAL AND FINAL OFFER ARBITRATION

### Pre-Intervention

Although the labor-management literature on the pre-intervention effects of CA and FOA in actual practice is rapidly expanding, these field studies are difficult to evaluate. They are primarily case studies or similar designs containing numerous threats to internal validity (Campbell & Stanley, 1966). Although these studies have substantial external validity, it may be difficult to draw valid inferences concerning cause and effect. Also, the data may be so weak that divergent conclusions can be drawn from an identical data base. Problems like this are not unusual in organizational research, but until they are addressed, definitive answers to questions about the usefulness of CA and FOA will be difficult.

Some of these methodological difficulties can be overcome in the laboratory, but to date very few studies (Johnson & Tullar, 1972; Notz & Starke, 1978; Subbarao, 1978; DeNisi & Dworkin, 1979) have explicitly compared CA and FOA. With the exception of Johnson & Tullar (1972), these studies have found that bargainers anticipating FOA are closer to agreement at the end of bargaining than are those anticipating CA. Although this partial convergence is encouraging, there is an obvious need for additional research because the number of studies is so very small.

Not only is further research on the basic pre-intervention effects of CA and FOA desirable, but other procedural or human factors that could enhance or inhibit these pre-intervention effects also should be examined. These other variables have important practical implications. They may, for example, either exaggerate the basic pre-intervention effects to such an extent that an intervention is not needed or, alternatively, they may make an intervention inevitable. Two variables that might be important in this sense are (1) the extent to which the parties trust each other (Kochan & Baderschneider, 1978) and (2) the extent to which the third party role is limited to arbitration (Feigenbaum, 1975).

With respect to (1) above, if an initially positive interpersonal climate existed, the anticipation of FOA might trigger cooperative behavior (and thus even more positive attitudes) sufficient to ensure either a negotiated agreement or an acceptable third party decision. Conversely, an initially negative climate might impede compromise and negotiating behavior so that the gap in the parties' positions remained wide despite the threat of FOA. In such a situation, the initially negative climate probably would be worsened because the arbritrator would be forced to choose between extreme positions, either of which would be unacceptable to at least one of the parties.

A high level of trust might induce cooperation between parties bargaining under both CA and FOA. However, such behavior should be enhanced more under FOA than under CA. In the latter situation any cooperative tendencies might be neutralized by the chilling effect.

With respect to (2) above, the potentially negative effects of FOA might be minimized through some form of mediation (Feigenbaum, 1975). Coupling FOA with mediation should generate complementary forces (pressure plus help) on the parties to reach a settlement. Mediation should enable the parties to determine more accurately the reasonableness of their positions vis-à-vis the standards likely to be applied by the arbitrators. Mediation, therefore, should help to minimize the risk of the arbitrator's having to choose later between extreme positions because of an error in judgment by one or both parties. Similarly, mediation should improve the interpersonal climate and thereby increase the probability of a negotiated settlement.

For CA, however, mediation may not have a positive effect. Because the parties expect a compromise decision rule to be applied, any mediation suggestion—itself a compromise—would only strengthen these expectations. Thus, combining mediation with CA and FOA might enhance their basic pre-intervention tendencies, that is, the distance between bargainers' positions should be greatest for CA with mediation, next greatest for "pure" CA, next greatest for "pure" FOA, and least for FOA with mediation.

### Post-Intervention

Of the several post-intervention effects mentioned earlier, bargainer commitment—the extent to which the disputing parties support the negotiated or imposed settlement—is particularly important. Indeed, the widely held preference for negotiated rather than imposed agreements seems to be based on the assumption that third party settlements negatively affect commitment. Such concerns have led some observers to reject all arbitration, but others (Foster, 1974) have focused on FOA as being particularly destructive of commitment. One reluctant final offer arbitrator, who had attempted (unsuccessfully) to persuade the parties to allow him to impose a conventional (compromise) decision, wrote in his report:

> Such a process (final offer arbitration) is destined to delight the winner and disappoint the loser. It may, in fact, create new tensions and greater burdens than the parties anticipated (Williams, 1979, p. 19).

Although such statements clearly imply that CA and FOA differentially affect commitment, there is little empirical evidence (laboratory or field) to support this belief. Laboratory studies on arbitration have completely ignored post-intervention effects (Rubin, 1980), and field studies have depended heavily upon archival indicators of commitment such as noncompliance (e.g., unauthorized strikes), which are unlikely to be sensitive to anything but extreme differences in commitment.

In spite of these problems, theoretical predictions concerning the effects of CA and FOA on commitment are not difficult to make. For this purpose, two rudimentary models have been developed: the "win-lose" model and the "behavioral" model.

## MODELS

### The Win-Lose Model

The win-lose model can be derived easily from comments like that of Williams (1979). His statement implies that under FOA, commitment in each round of negotiations will be determined strictly by whether a party wins or loses; commitment therefore should be either total or zero. In this view, commitment is entirely a function of the arbitrated outcome: a positive outcome leading to high commitment and a negative outcome leading to low commitment. Because outcomes will be more positive when the differences between the bargainer's offer to the arbitrator and the arbitrator's decision is minimized, commitment should be maximized when that difference is zero (winner) and minimized when that difference is large (loser). There are other definitions of winning and losing that could be used, but this "difference" idea clearly reflects one of the key dimensions of FOA and it can be used in assessing CA as well. It is used throughout the remainder of the paper.

The idea of winning and losing is not as clear in CA, however. Applying this difference idea to CA implies that for a given round of negotiations, CA bargainers generally should be less committed than FOA winners, but more committed than FOA losers. If outcomes are consistently positive or negative, the win-lose model also implies that these effects may cumulate over time so that FOA might result in ever widening differences between the parties.

### The Behavioral Model

The social psychological literature contains a different perspective regarding the development of commitment. That literature provides considerable theoretical and empirical support for the argument that commitment occurs as a result of behavioral acts (Aronson & Mills, 1959; Brehm, 1956; Kiesler, 1971; Zimbardo, 1968). Although all acts are not equally committing (the degree of commitment varying with revocability of the act, volition of the individual, the extent to which the commitment is public, etc.), behavior is still the necessary condition for commitment. Moreover, commitment not only begins with behavior (Salancik, 1977), but it tends to constrain future behaviors, beliefs, and attitudes so that they are generally consistent with the individual's past (committing) behavior. In short, individuals become committed because they behave, and that behavior becomes a constraining reality for future behavior.

This behavioral model provides potential insights into important effects of CA and FOA on commitment. As noted above, because bargainers anticipating CA may have little incentive to bargain seriously, they also are uninvolved behaviorally in negotiations. This lack of concessionary behavior may lead to a lack of commitment to any bargaining outcome based on an imposed third party decision rather than the compromises of the parties themselves. Bargainers in FOA, on the other hand, are very motivated to make concessions during negotiations in attempting to avoid arbitration. In so doing they engage in conciliatory behaviors, possibly becoming more committed to a decision, even if that decision is imposed by the arbitrator. Unlike the win-lose model, the behavioral model predicts higher commitment for FOA bargainers (even losers) than for CA bargainers.

## HYPOTHESES

Based on the discussion above, the following hypotheses are proposed: First, *bargainers expecting FOA should have lower aspiration levels prior to negotiations and should exhibit more conciliatory behavior during bargaining than individuals expecting CA*. Second, *because of these pre-intervention effects, the behavioral model predicts greater commitment of bargainers to outcomes imposed by an arbitrator under FOA than under CA. The win-lose model*, on the other hand, *predicts that final offer winners will be highly committed to the settlement, final offer losers will be uncommitted, and CA bargainers will be intermediate in commitment.* These differential effects should become more pronounced over succeeding negotiations. Combining mediation with these two forms of intervention should strengthen their relative effects. Finally, *a higher level of interpersonal trust between the bargainers should enhance the pre-intervention (and thus the post-intervention) effects of FOA*. However, an initially low level of trust between bargainers should inhibit conciliatory behavior during bargaining and should have a negative impact on bargainer commitment to the arbitrator's decision.

## METHOD

### Subjects and Experimental Task

The subjects were 160 male and female students enrolled in an introduction to business course. They received points toward their course grade for participating in the experiment. In addition, they were paid based on their performance during bargaining. Subjects were assigned the role of either a consumer (plaintiff) lawyer or a company (defendant) lawyer. Their task was to negotiate an out of court settlement in a damage suit brought against the company by a consumer who had been injured using the company's product. Subjects bargained with one another in two separate cases; the same roles, bargaining procedures, and intervention modes were used in both cases for a given dyad.

### Variables and Design

A 2×4 design with two waves (cases) was used. The first independent variable was the level of trust (high or low) that existed between the two bargainers. The other independent variable was the mode of third party intervention—conventional arbitration, conventional arbitration with mediation, final offer arbitration, or final offer arbitration with mediation. (The manipulations of these two independent variables are described in detail in the experimental procedure section below.) Subjects were randomly assigned to consumer or company lawyer roles in bargaining dyads; 10 dyads were randomly assigned to each of the 8 different conditions.

The first dependent variable, aspiration level of subjects, was measured by asking subjects to indicate, immediately prior to negotiations, what they honestly felt would be the most reasonable settlement for both parties in terms of a dollar figure. The second dependent variable was the outcome of the bargaining session, measured by the dollar differences separating the parties at the end of the negotiating session. This variable could range from $0 (settlement reached) to $450,000 or more (parties still far apart after negotiations). The third dependent variable was the subjects' level of commitment (both attitudinal and behavioral) to the settlement they reached themselves or had imposed on them. Attitudinal commitment was measured by asking subjects (1) how responsible they felt for the outcome of the negotiations, (2) how willing they were to use the same impasse procedure again, (3) how reasonable they felt the arbitrator's decision was (if relevant), and (4) how committed they were to the settlement reached or imposed. Behavioral commitment was measured by observing whether subjects appealed the arbitrator's decision (low commitment) or did not appeal (high commitment). This appeal option allowed them to risk all or a portion of their earnings to that point. They were told that if their appeal was granted, the amount appealed would be added to their earnings; if the appeal was denied, the amount would be subtracted from their earnings. Subjects were not told of this appeal option until after the arbitrator's decision had been announced.

### Experimental Procedure

Two days before the experiment, subjects were given background material indicating the role they were to play (attorney for the plaintiff or for the defendent) and a 750 word explanation of the case over which they would bargain. The case indicated that a new car manufactured by one of the major automobile companies had gone out of control and had run into a tree, causing back injuries of disputed severity to the owner. The owner was suing the company for $450,000, claiming that the steering gear was defective and had caused the accident. The company denied any fault. The background material included a number of relevant precedents, and subjects could use them as they saw fit. Subjects were also given the Mach test (Christie, 1968) two days prior to the start of the experiment. They were told that the relevance of the test would become apparent when they participated in the experiment.

When subjects arrived at the experimental site, they were told briefly about the general procedures to be used. Each subject then was taken to a separate room and given a form containing biographical data on his/her opponent. Among these data was an item that indicated how the opponent had scored on the Mach test. Actual Mach scores were not used; instead, one half the subjects were told that their opponent had a high Mach score (low trust condition) and one half were told that their opponent had a low Mach score (high trust condition). In each dyad, both subjects were given the same data about their opponent, i.e., all trust manipulations were symmetrical. Subjects were not told their own score.

*CA Conditions*—At this time, subjects also were given additional information about the specific bargaining procedures and intervention mode that would be used. Subjects in the CA condition were told prior to negotiations that if they could not reach agreement during the allotted time, they would be required to submit their respective offers to a qualified arbitrator (from the law school faculty) who would consider them both and then impose an equitable compromise binding on both parties.

In the conventional arbitration with mediation (CAM) condition, subjects were told that if they had not reached agreement at a point halfway through the bargaining session, they then would be asked to send a form to a mediator indicating the dollar settlement they thought was reasonable. The mediator would suggest a figure that he felt the parties should agree on and that would be equitable for both parties. (The figure suggested was simply a split-the-difference compromise of the two figures submitted to the mediator by the bargainers). Subjects were told that they were free to accept or reject the mediator's advice. If they accepted the mediator's suggestion, they would cease bargaining and sign an agreement form. If one or both of the bargainers rejected the mediator's suggestion, bargaining would be continued as in the CA condition. Subjects were told that the mediator and arbitrator were the same person.

*FOA Conditions*—In the FOA condition, subjects were told that if they could not reach agreement during the allotted time, a qualified arbitrator would consider the offers of each side and then select one or the other, the one felt to be most reasonable. The arbitrator's choice then would be binding on the bargainers.

In the final offer-with-mediation (FOM) condition, the settlement figure suggested by the mediator varied randomly from $222,000 to $228,000, regardless of the amounts suggested by the bargainers. This was done so that subjects would not feel (particularly in the second case) that the arbitrator had mechanically picked the same figure. Subjects were free to accept or reject this suggested settlement. Procedures beyond this point were identical to those in the FOA condition.

*Payoff Schedule*—Subjects also were given information about their own payoff schedule. These schedules were asymmetrical, with the consumer lawyer receiving increasing amounts of money as the settlement figure increased, and the company lawyer receiving increasing amounts of money as the settlement figure decreased. Subjects were told not to share this information with their opponent. The subjects' schedules intersected at $225,000, at which point each would receive $2 (subjects were not aware of the point of intersection); the potential range of earnings for each bargainer was from $0 to $15. Subjects were given time to study this information on bargaining procedures and payoff schedules before bargaining began.

*Experimental Procedures*—Just prior to the actual bargaining session each subject was given a prenegotiation questionnaire. This included questions about the subjects' intended opening offers, their beliefs about how much their opponent could be trusted, and their perceptions of what constituted a reasonable settlement. On completion of the questionnaire, subjects were taken to the bargaining room and seated across the table from their opponent. A 12-inch high partition bisected the table so that subjects could consult their own payoff schedules and notes privately. The bargainers were told that they would have 15 minutes to negotiate and, after answering any questions, the experimenter left the room.

In the CAM and FOM conditions, the experimenter returned to the bargaining room seven minutes into the bargaining session and asked the bargainers if they had reached agreement. If they had not (and none had), subjects were given a request for mediation form on which they wrote down the dollar figure they felt represented a reasonable settlement. The experimenter then left the room, ostensibly to take the offers to the mediator (in fact, there was no mediator). The experimenter instead examined the offers and, depending on the condition, entered a suggested figure on a suggestion from mediator form, signed a fictitious mediator's name at the bottom, and returned it to the bargainers. The offers of both parties were shown clearly on this form. Bargainers were free to accept or reject the suggested settlement amount.

In all four conditions, the experimenter returned after 15 minutes and asked the subjects if they had reached agreement. If they had, they signed an agreement form indicating the dollar figure they agreed on. If they had not, subjects were separated and filled out a request for arbitration form on which they indicated the dollar amount they thought constituted an equitable settlement. This amount did not have to be the same as their last public offer. The experimenter then ostensibly took these offers to the arbitrator for his decision (there actually was no arbitrator).

While the subjects were filling out a postnegotiation-preintervention questionnaire, the experimenter was making the arbitration decision. In the CA and CAM conditions a split-the-difference decision rule was used, and this amount was the settlement imposed. In the FO and FOM conditions, the experimenter simply picked the offer closest to $225,000 and imposed this figure on both parties. In the unusual case in which the bargainers' offers were equidistant from $225,000 (for example, the company lawyer offered $125,000 and the consumer lawyer demanded $325,000), the experimenter randomly chose one offer. In all four conditions, the decision was returned on an arbitrator's decision form, which contained both subjects' offers and the arbitrator's decision. The subjects were given time to assess the implications of the decision for their payoffs and then filled out a postintervention questionnaire assessing their feelings of commitment to the decision, their perception of the reasonableness of the arbitrator's decision, and the extent to which they felt responsible for the bargaining outcomes to that point. After answering these questions, subjects were given the appeal option mentioned earlier.

Once this had been completed, subjects were given another case to read and were told that they again would bargain with their opponent and try to reach an out of court settlement in a second case. Subjects were told that the mediator-arbitrator was a different person than the one in the first case. From this point on, the procedures were identical to those used in the first case. After the entire process had been repeated, subjects were debriefed, asked not to discuss the experiment with anyone, and told when they could pick up their money for the experiment.

## RESULTS

The results deal briefly with the pre-intervention effects of the two forms of arbitration and extensively with an analysis of commitment of the bargainers to the settlement that was reached or imposed. First and second round results are presented together, with second round results contained in parentheses.

### Manipulation Check

To determine the success of the trust manipulation, subject responses to three questions on the prenegotiation questionnaire were analyzed. Subjects were asked to indicate on 9-point scales (1) how honest they felt their opponent would be, (2) how likely it was that their opponent would attempt to manipulate them, and (3) how much they trusted their opponent. Because all three variables were significantly intercorrelated (all $ps < .001$), they were combined into an index and the index means for the high and low trust conditions were compared. For both rounds, subjects in the high trust condition trusted their bargaining opponent significantly more than did subjects in the low trust condition. In the high trust condition the mean was 5.82 (second round mean was 4.80), while in the low trust condition the mean was 4.07 (second round mean was 3.76). A comparison of these means yielded in the following: $F(1,158)=34.86$ (second round was 6.86), $p<.0001$ (second round $p<.001$).

### Effects of Trust and Mediation

The results indicated that supplementing pure CA and FOA with mediation generally did not cause significant changes in the dependent variables (differences usually were in the directions hypothesized but were not statistically significant). Accordingly, the CAM and CA conditions were collapsed, as were the FO and FOM conditions. Similarly, the trust categories were collapsed because the amount of trust existing between the parties did not consistently influence their aspirations or behavior. The results reported below are on this combined basis.

### Aspiration Levels

The different modes of anticipated arbitration were predicted to have differential effects on subjects' aspiration levels. On the prenegotiation questionnaire, subjects were asked what they felt would be a reasonable settlement for both parties. Because the unit of analysis was the bargaining pair, the different in dollars (in 000s) between the individual aspirations of each pair was analyzed. An ANOVA (Table 1-IA) indicated a significant effect of the form of arbitration for both rounds. This was due to the smaller difference in aspiration levels in the FOA condition [$M=252.88$ (191.38)] as compared to subjects in the CA condition [$M=307.00$ (274.27)].

### Analysis of Bargaining Outcomes

Before presenting these results it should be noted that bargainer payoffs were arranged in such a way that reaching agreement was rather difficult. Nevertheless, some bargainers reached agreement in each round (one FOA and one CA dyad in the first round, and seven FOA and six CA dyads in the second round). A more sensitive measure of the differential impact of the two basic forms of arbitration is the difference in dollars separating the pairs at the conclusion of bargaining. This is the measure used in subsequent analyses.

This measure showed that subjects anticipating FOA were closer to agreement at the end of both rounds of bargaining than were subjects in the CA condition (Table 1-IB). This was due to the smaller difference between subjects' offers to the arbitrator in the FOA condition [$M=181.40$ (114.88)] than in the conventional arbitration condition [$M=331.63$ (295.63)].

**TABLE 1**
**ANOVA of Form of Arbitration on Pre- and Post-Intervention Attitudes and Behavior (Second Round in Parentheses)**

| *Variables* | *df* | *MS* | *F* | *p* |
|---|---|---|---|---|
| *I. Pre-Intervention Effects* | | | | |
| A. Aspiration levels | | | | |
| Form of arbitration | 1 | 58,590 (137,448) | 6.51 (4.71) | .01 (.03) |
| Error | 78 | 8,995 (29,184) | | |
| B. Bargaining outcomes | | | | |
| Form of arbitration | 1 | 451,351 (653,411) | 33.02 (22.16) | .0001 (.0001) |
| Error | 78 | 13,666 (29,479) | | |
| *II. Post-Intervention Effects* | | | | |
| A. Attitudinal commitment (COM-A) | | | | |
| FOA winners, FOA losers, and conventionals | 2 | 109.79 (48.90) | 58.70 (21.79) | .0001 (.0001) |
| Error | 157 | 1.87 (2.24) | | |
| B. Behavioral commitment[a] (COM-B2) | | | | |
| FOA losers and conventionals | 1 (1) | 268,732 (29,263) | 3.86 (.60) | .05 (ns) |
| Error | 73 (30) | 69,484 (48,630) | | |
| C. Attitudinal commitment[b] (COM-A) after two rounds | | | | |
| FOA winners, losers, and agreers; conventionals and conventional agreers | 8 | 13.30 | 6.33 | .0001 |
| Error | 151 | 2.10 | | |
| D. Behavioral commitment[a] (COM-B2) after two rounds | | | | |
| FOA losers (WL, LW, LL) and conventionals | 3 | 154,234 | 4.17 | .01 |
| Error | 29 | 36,947 | | |

[a] FOA winners are excluded because none appealed.
[b] The win, lose, etc. categories are based on the second round outcomes.

## Form of Arbitration and Commitment

The extent to which commitment was influenced by the form of arbitration was a major focus of this research. Accordingly, the analysis below (1) compares commitment of bargainers in the CA and FOA conditions, (2) compares commitment of final offer winners and losers with that of conventionals, (3) analyzes the impact of the subjects' cumulative experience with CA and FOA, and (4) analyzes the effect of concessionary behavior on commitment.

*Commitment and Form of Arbitration*—As noted above, attitudinal commitment (COM-A) to the negotiated or imposed settlement was measured by subject responses to four questions. These measures were all highly intercorrelated (all $ps < .001$), so they were combined into an index. The behavioral commitment measures were concerned with whether or not subjects appealed the arbitrator's decision (COM-B1) and if so, the dollar amount (in 000's) of this appeal (COM-B2). An appeal was presumed to mean lower commitment than when no appeal was made. Similarly, the greater the amount appealed, the lower the commitment was assumed to be. The correlation between COM-A and COM-B2 was $-.51$ ($-.41$), $p<.001$ (.001).

Because bargaining necessarily occurs in pairs, the first analysis focused on the commitment effects of the form of arbitration at the dyadic level. For COM-A, subjects in the FOA condition were significantly more committed to the settlement than were subjects in the CA condition in both rounds [$M=5.09$ (5.03) and 4.29 (4.51), respectively, $F(1,78)=15.77$ (5.59), $p<.0002$ (.02)].

For COM-B1 in the first round, significantly more bargainers in the CA condition ($n=44$) appealed the arbitrator's decision than in the FOA condition ($n=32$; $X^2(1)=3.69$, $p<.05$). The large number of appeals in the CA condition is striking, given that here subjects received at least some of what they wanted through the compromise decision rule. The second round showed no significant differences across conditions. For COM-B2, the conditions did not differ significantly for either round. Thus, bargaining pairs in the FOA condition were more committed than those in the CA condition on the attitudinal commitment measure, and either equally or more committed on the behavioral measures across both rounds of negotiations.

*Winners, Losers, and Conventionals*—Although dyads were generally more committed under FOA, it produced obvious winners and losers that were not found under CA. Table 1 shows significant differences in commitment between FOA winners, FOA losers, and conventionals. For COM-A (Table 1-IIA), the most committed bargainers were FOA winners; next were conventionals, and the least committed were FOA losers [$M=6.68$ (6.22), 4.30 (4.53), and 3.52 (3.91), respectively]. A posteriori comparisons (using the Scheffé test) indicated significant differences between these groups in the first round (all $ps<.05$), but only between FOA winners and FOA losers in the second round. There was no difference between FOA losers and conventionals in the second round.

For COM-B1, there were overall significant differences among FOA winners, FOA losers, and conventionals [$X^2(2)=49.87$ (14.04), $p<.001$ (.009)]. FOA winners appealed less often than did FOA losers [$X^2(1)=47.69$ (14.58), $p<.001$ (.002)] and conventionals [$X^2(1)=31.85$ (7.99), $p<.001$ (.005)]. FOA losers appealed more often than did conventionals in the first round, but not in the second [$X^2(1)=6.01$ (2.61), $p<.02$ (ns)].

For COM-B2, Table 1-IIB shows significant differences between FOA losers and conventionals, but only for the first round, with conventionals appealing for a lower amount (in 000s) than FOA losers (288.02 vs. 409.58, respectively).

*Commitment and Cumulative Experience*—Subjects in the FOA conditions had one of six experiences—they won in both rounds (WW), they won in one and lost in one (WL or LW), they lost in both (LL), or they agreed in one round but not in another (A-NA or NA-A). No FOA subjects agreed in both rounds. Subjects in the CA condition had one of three basic experiences—they agreed in one round but not the other (A-NA or

NA-A), or they did not agree in either round. No CA subjects agreed in both rounds. Table 1-IIC analyzes the commitment of bargainers on the basis of their cumulative experience. The data indicate overall significant differences between four of these groups. For COM-A, the following a posteriori comparisons were significant at $p<.05$: WW-WL ($M=6.53$ vs. 4.31), WW-LL ($M=6.53$ vs. 3.48), WW-CA ($M=6.53$ vs. 4.54) and LW-LL ($M=5.89$ vs. 3.48). Bargainers in the FOA condition who lost both rounds ($n=16$) were not significantly less committed than were bargainers in the CA condition. All others who experienced FOA were more committed than those in the CA condition (although some not significantly).

For COM-B2 (Table 1-IID), only one a posteriori comparison was significantly different at $p<.05$: WL-LL ($M=185.71$ vs. 518.42). None of the FOA bargainers were any less committed than the conventionals.

For COM-B1, Table 2 indicates an overall significant relationship between the conditions [$X^2(4)=14.49, p<.005$]. WWs appealed significantly less than did conventionals ($X^2(1)=5.19$, $p<.02$), but all other comparisons were not significant. For the COM-A, COM-B2, and COM-B1 measures, these data suggest that over the long run (when a given individual could be expected to win some cases and lose others), commitment under FOA would be equal to or higher than under CA.

**TABLE 2**
**Cross-Tabulation for Decision to Appeal (COM-B1)**
**(After Second Round)**

| *Decision to Appeal* | *Experience with Arbitration* | | | | |
|---|---|---|---|---|---|
| | *WW* | *WL* | *LW* | *LL* | *CA* |
| Yes | 0 | 7 | 1 | 7 | 17 |
| No | 16 | 9 | 15 | 9 | 49 |

As a further test of the effect of experience on commitment, the bargainers' willingness to use the same arbitration procedure again was analyzed. FOA winners, FOA losers, and FOA agreers were isolated on the basis of their second round experience, and their stated willingness to use the FOA procedure again (as measured on a 9-point Likert scale) was compared to the willingness of conventionals and CA agreers to use the CA procedure again. The data indicate significant overall differences [$F(4,155)=3.32$, $p<.01$], but a posteriori tests revealed only marginally significant differences between FOA winners and losers ($M=5.94$ vs. 4.48) and between FOA winners and conventionals ($M=5.94$ vs. 4.42). Thus, FOA winners tended to be more willing than were conventionals and FOA losers to use the same procedure again.

*Concession Behavior and Commitment*—The win-lose model predicted that commitment would vary as an inverse function of the difference between the arbitrator's decision and the bargainer's offer. The behavioral model predicted that commitment would vary positively with bargainers' concessionary behaviors. To test these predictions, attitudinal commitment (COM-A) and behavioral commitment (COM-B2) were correlated with (1) the difference between the arbitrator's decision and the bargainer's last offer to the arbitrator (Arbdec-Offer), and (2) the difference between the bargainer's opening offer and the offer to the arbitrator (concession).

### TABLE 3
### Correlational Analyses of Commitment (Second Round in Parentheses)

| | *Total Sample* | | | |
|---|---|---|---|---|
| | *COM-A*[a] [$n$ = 160 (160)] | | *COM-B2*[b] [$n$ = 76 (33)] | |
| Arbdec-Offer[c] | −.54*** | (−.26***) | .26** | (.06) |
| Concession[d] | .35*** | (.08) | −.28** | (−.03) |
| | *FOA Winners* | | | |
| | *COM-A* [$n$ = 39 (33) | | | |
| Arbdec-Offer[e] | N/A | (N/A) | | |
| Concession | −.24 | (.09) | | |
| | *FOA Losers* | | | |
| | *COM-A* [$n$ = 39 (33)] | | *COM-B2*[b] [$n$ = 31 (14)] | |
| Arbdec-Offer | −.29* | (−.36**) | .37** | (.08) |
| Concession | .10 | (.08) | −.55*** | (−.29) |
| | *FOA Agreers* | | | |
| | COM-A [$n$ = 2 (14)] | | | |
| Arbdec-Offer | N/A[f] | (N/A) | | |
| Concession | N/A[g] | (−.40) | | |
| | *Conventionals*[h] | | | |
| | COM-A [$n$ = 80 (80)] | | *COM-B2*[b] [$n$ = 44 (18)] | |
| Arbdec-Offer | −.09 | (.00) | −.01 | (−.03) |
| Concession | −.37*** | (.00) | −.27* | (−.02) |

[a] Attitudinal commitment.

[b] Behavioral commitment (appeal amount). Includes only those who appealed.

[c] The difference between the arbitrator's decision and the party's last offer to the arbitrator.

[d] The difference between the party's opening offer and the offer to the arbitrator.

[e] By definition the winners' offers to the arbitrator were chosen. Thus the difference between the offer to the arbitrator and the arbitrator's decision is always zero, and the correlation is not meaningful.

[f] The correlation coefficient is not meaningful because the bargainers reached agreement.

[g] The correlation coefficient could not be computed because the $n$ was too small.

[h] All conventionals (whether or not they reached agreement) were considered together because there were no differences between the two groups for the variables listed.

*$p < .05$

**$p < .01$

***$p < .001$

The total sample showed significant relationships for both measures (1) and (2) above (Table 3). The greater the difference between the arbitrator's decision and the bargainer's last offer to the arbitrator, the lower the attitudinal commitment and the greater the amount appealed. The greater the difference between the bargainer's opening offer and the offer to the arbitrator, the greater the attitudinal commitment and the lower the amount appealed.

Among final offer losers, Arbdec-Offer was significantly related to COM-A for both rounds, but to COM-B2 only in the first round. The bargainer's concession was related only to COM-B2 in the first round and tended to be related to behavioral commitment in the second, although not significantly.

Conventionals showed no relationships between either measure of commitment and Arbdec-Offer in either round of bargaining. Concession by the bargainers was significantly related to both measures of commitment for the first round, but not for the second.

## DISCUSSION

This study adds to the growing evidence that CA and FOA have quite different effects on the aspirations and behaviors of bargainers. Pairs who expected FOA were closer together—in terms of both the differences between their aspirations prior to bargaining and their offers to the arbitrator at the conclusion of bargaining—than were pairs who expected CA. Similar results were obtained for both rounds of bargaining.

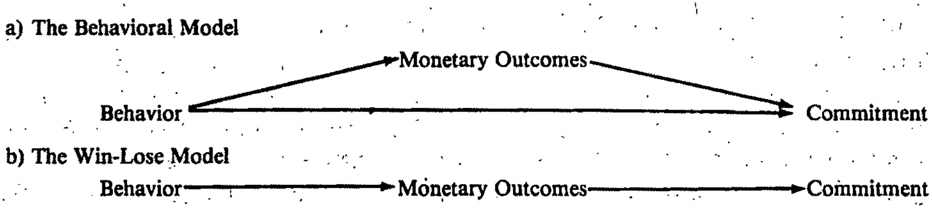
An encouraging aspect of these results is that they were generated in a non labor-management context in which subjects were involved in different roles and different tasks than are those in the typical FOA experiment. The results, however, were consistent with other experimental studies of FOA (Notz & Starke, 1978; Subbarao, 1978; DeNisi & Dworkin, 1979). Thus, increased confidence concerning the generalizability of results from FOA experiments is warranted.

Of equal importance are the findings regarding postintervention commitment. Because even the threat of FOA may not always be sufficient to generate a negotiated agreement, some observers have expressed concern about the negative effects that might follow from an actual FOA intervention. This research suggests that these concerns may not be warranted. At a dyadic level of analysis, bargainers who experienced FOA were more committed (attitudinally) for both rounds of negotiations than were their CA counterparts. Behaviorally, the FOA pairs also exhibited equal or greater commitment than did the CA dyads. At an individual level of analysis, there was some evidence of a win-lose effect, both attitudinally and behaviorally. However, even though FOA losers were less committed than FOA winners, the commitment of FOA losers and that of conventionals did not differ consistently. When the cumulative effects of the two forms of arbitration over time were considered, the commitment of FOA losers compared favorably with that of conventionals. Thus, these data suggest that as a history of bargaining outcomes is developed, the win-lose effect should diminish.

Any discussion of the relationship between commitment and the form of arbitration contains important theoretical assumptions about the antecedents of commitment. Although the behavioral model predicts that commitment will vary positively with the bargainer's concessionary behavior, the win-lose model views commitment as a function of the difference between the bargainer's offer to the arbitrator and the arbitrator's decision (Arbdec-offer). Differences in the commitment produced by CA and FOA, therefore, are assumed to be mediated by one or the other of these two variables. Although the present study was not specifically designed to test the descriptive accuracy of the two models, a post hoc comparison of them is informative.

Before the models can be directly compared, however, the following changes must be made: First, the amount conceded should be added to the win-lose model because it obviously influences the difference between the bargainer's offer to the arbitrator and the arbitrator's decision (Arbdec-offer). Second, because monetary outcomes were directly related to Arbdec-offer and undoubtedly are an important component of the win-lose effect, the Arbdec-offer variable in the win-lose model can be replaced with monetary outcomes. Finally, monetary outcomes can be added to the behavioral model because they are a consequence of concessionary behavior that influences commitment. Given these changes, the behavioral model predicts both a direct and an indirect relationship (through monetary outcomes) between bargaining behavior and commitment, and the win-lose model predicts only an indirect relationship between behavior and commitment (Figure 1).

**FIGURE 1**
**Two Views of How Commitment Is Generated**



If controls are now introduced for monetary outcomes, the two models can be compared. The win-lose model predicts that controlling for monetary outcomes will reduce the relationship between concession and commitment to zero. No such effect is predicted by the behavioral model. In fact, controlling for monetary outcomes had virtually no effect. Of the 15 relevant correlations between concession and commitment reported in Table 3, only trivial changes were evident when monetary outcomes were partialled out. Thus, these data offer little support for the win-lose model; alternatively, of course, they reemphasize the potential importance of behavior during bargaining as a determinant of postnegotiation commitment.

Overall, the results of this study suggest both the importance and the complexity of the relationship between bargaining behavior and commitment. In this context the lack of results regarding the effects of mediation and trust was disappointing. It was hoped that the manipulation of these two variables would provide some data on the conditions under which the two forms of arbitration would produce substantial differences in pre-intervention behaviors and thus post-intervention commitment. Perhaps mediation and trust have more of an impact in prolonged negotiations than they do in short term bargaining situations like those examined in this research. Whatever the reason, efforts to identify the variables that magnify the behavioral effects of the two forms of arbitration should be continued.

In this general vein, it should be noted that external validity is a problem that must be recognized in all laboratory based research. In this study, for example, some of the experimental circumstances were neither consistent with the real world nor were they intended to be. It would be satisfying to conduct research that maximizes both internal and external validity, but this is not possible because one type of validity can be improved only at the expense of another. There simply is no such thing as *the* perfect design (McGrath, 1980).

Although internally and externally valid results cannot be generated from any single methodology, they can be obtained by accumulating findings across studies with widely differing flaws (Salipante, Notz, & Bigelow, in press). Thus, a variety of strategies and methods must be encouraged. Indeed, if methodological myopia can be avoided, the diversity of approaches that already exist will prove to be a tremendous advantage. In commenting on this issue, Cook and Campbell (1976) note that in disciplines such as organizational research, in which different methodological orientations exist, researchers may have difficulty communicating with one another. At the same time, these disciplines have an advantage because at least some individuals are addressing each type of validity. Thus, in arbitration research, both field and laboratory studies have been conducted, and both suggest that the FOA procedure is working to a large degree in accordance with the theoretical predictions of how it should work. Continued laboratory and field work therefore is needed to understand more fully the fine points of the effects of final offer arbitration.

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# *Research Notes*

## WORK RELATED COMMUNICATION, ENVIRONMENTAL UNCERTAINTY, AND SUBUNIT EFFECTIVENESS: A SECOND LOOK AT THE INFORMATION PROCESSING APPROACH TO SUBUNIT COMMUNICATION

**PAULA C. MORROW**
**Iowa State University**

A contingency approach is one of the most common perspectives evident in contemporary organizational research. Organizational communication researchers have not been immune to the influence of contingency thought and have embraced it in the form of a general information processing model of organizational design (Tushman & Nadler, 1978). Tushman (1978, 1979a, 1979b) has attempted to explore the utility of this model by examining its capacity to explain organizational subunit effectiveness. The purposes of this paper are (1) to replicate a portion of this work in a different sample of organizational subunits (i.e., assess external validity), (2) to evaluate the impact of an additional task environment variable heretofore unconsidered (environmental complexity), (3) to expand the number and type of subunit effectiveness criteria to reflect the multidimensional nature of effectiveness, and (4) to propose a more rigorous test for the empirical examination of hypothesized contingency relationships.

Organizational (subunit) contingency theories traditionally have argued that when contextual variables (e.g., technology, environmental conditions) are matched with appropriate organizational arrangements (e.g., centralization, communication), effectiveness of the unit will be enhanced. An empirical assessment of this set of interrelationships generally is termed a test of the congruency hypothesis. In organizational communication research, the congruency hypothesis has focused on matching information processing capacities (e.g., unit communication practices) with information processing requirements (e.g., characteristics of the unit's work such as routineness and/or task environment conditions such as change or complexity). Matching requirements with capacities is said to promote effectiveness (Tushman & Nadler, 1978). The logic behind this model rests on the assumptions that nonroutineness and unstable environmental conditions directly increase uncertainty and indirectly increase information processing requirements. More frequent, decentralized, or organismic communication practices, (i.e., techniques for improving information processing capacity) are presumed to increase the unit's ability to handle uncertainty. Units facing high uncertainty that are able to develop organismic communication practices thus should be able to offset at least some of the uncertainty effects, reduce equivocality, and manifest higher effectiveness than units facing high uncertainty that maintain more mechanistic communication practices. Furthermore, the contingency principle should hold for units facing low levels of uncertainty and low information processing requirements. Because techniques for improving information processing capacity are time consuming and expensive (Tushman & Nadler, 1978), units with low information requirements that promote organismic communication practices should be less effective than units with low information requirements that divert their resources to other areas. In short, effectiveness should be optimized when high information requirements are matched with high information capacity and when low information requirements are matched with low information capacity.

There are few empirical studies of this communication based congruency hypothesis. Tushman (1979b) has reviewed some early work by Burns and Stalker (1961) and others that does imply that more successful units facing turbulent environments have been characterized by more intense communication practices. However, none of these studies, as Tushman points out, deals with communication between different parts of the organization or with units outside the organization. Tushman's (1977, 1978, 1979a, 1979b) own work has served to ameliorate these and other deficiencies by his consideration of multiple communication areas and patterns. These studies, based on the same data set, have provided some support for the congruency hypothesis outlined in information processing terms. Clearly, Tushman's approach merits further empirical consideration.

In an effort to evaluate further the information processing approach, the congruency hypothesis was reevaluated in a sample of nonprofit organizational subunits. Tushman's (1979b) investigation of research and development subunits served as a basis for comparison. In both studies information processing capacity is measured by work related communication practices. Tushman's intraproject communication measure is paired with an intraunit communication measure, project to laboratory communication is equated with unit to regional office communication, and project to operational areas communication (suppliers, customers) is matched with unit to county sources communication. A leader approval (performance) rating also was used in each study. Tushman's analysis is extended by incorporation of a second task environment uncertainty concept, environmental complexity, and by multiple measures of subunit effectiveness.

An additional modification concerns the data analysis procedure used to test the congruency hypothesis. Tushman evaluated the hypothesis by comparing mean communication variable scores of high performing units facing uncertain conditions to those of high performing units facing more certain conditions. By demonstrating that higher performing units in the uncertain condition possessed significantly more of the predesignated organismic communication practice, Tushman hoped to conclude that his data supported the contingency model. More rigorous tests of the hypothesis might have been employed by casting the congruency hypothesis as a moderator variable question (Zedeck, 1971).

If the congruency hypothesis as presently formulated is valid, low performing units should be characterized by a less appropriate match, as indicated by an inverse relationship between uncertainty and communication measures, and high performing units should demonstrate an appropriate fit as evidenced by a positive relationship between the measures. Furthermore, the difference between the two correlations should be significantly different. An alternative, less stringent test, sometimes termed single group validity (Boehm, 1972), would be to require that only one correlation be statistically significant in the predicted direction and the other not be significantly different from zero (Zedeck, 1971). The moderator approach was adopted as a final effort to refine and extend Tushman's work.

## Procedures

*Sample and Data Collection Techniques*—Usable data were obtained on 90 of 100 subunits of a midwest state Extension Service. These subunits provide a diverse number of educational programs and services to meet the needs of their predominately rural and agriculturally oriented clientele. The state organization is subdivided into three levels: a county or subunit level, an area level consisting of 12 regional offices, and a state or central administration level. In addition, each county unit is advised and partially controlled by a local citizens' advisory board. The chief administrator of each subunit, the executive officer of each subunit's citizens' board, and the chief administrator of each regional office completed mailed or personally administered questionnaires. Participants were asked to adopt a subunit perspective in formulating their responses and were assumed capable of providing valid information about subunit characteristics.

*Measures*—(1) Work related communication: Each subunit administrator provided a rating of the extent to which his unit (a) engages in intraunit communication and information exchanges (two items), (b) exchanges useful information with regional office personnel (four items), and (c) exchanges useful information with county representatives and residents (five items). Measures for these three communication domains were found to be adequately reliable ($\alpha$s = .81 to .86) and reasonably independent of one another ($r$s = .04 to .21).

(2) Environmental conditions: (a) Environmental change was operationally defined as the degree of demographic change from 1960 to 1970 in the county affiliated with each subunit. It was measured by using Census data describing the absolute percent change in county population and the absolute percent change in county population over 18 years of age during the specified period. (b) Environmental complexity was measured by asking each subunit administrator to evaluate the extent to which he perceives

the county environment to be unpredictable and the extent to which he has inadequate information for decision making (three items). Reliability values for the two environmental measures were .86 and .60 respectively. These measures were observed to be empirically distinct ($r = .07$).

(3) Effectiveness: (a) The regional office administrator rated the effectiveness of each subunit located in his jurisdiction by completing a 6-item leader approval measure focusing on his evaluation of the quality of programs offered by the subunit and the ability of the subunit to operate independently. (b) Goal attainment and (c) efficiency were evaluated by the subunit administrator. The goal measure (seven items) emphasized the extent to which programs provided were consistent with predetermined objectives; the efficiency measure (two items) stressed optimal use of staff time and resources. (d) The citizens' advisory board officer provided the community approval measure by completing nine items related to his perception of how satisfied county residents were with subunit programs and services. All of the effectiveness measures manifested adequate reliability ($\alpha$s = .84 to .91) with the exception of efficiency ($\alpha = .47$). In addition, these measures were found to be reasonably independent of one another ($r$s = .04 to .26). Effectiveness scores for each type of effectiveness were split at the median in order to create high and low categories.

## Results

Results of this study can be approached from three perspectives: (1) a comparison of Tushman's (1979b) environmental change findings with present findings; (2) a review of findings connected with the second component of task environment, environmental complexity; and (3) an evaluation of whether subunits manifesting high effectiveness more often demonstrate a congruent fit between their information processing requirements (level of environmental uncertainty) and their information processing capacities (work related communication practices) than do less effective subunits.

(1) Based on the information processing model, Tushman hypothesized that high performing subunits would demonstrate a positive relationship between environmental change and (a) project and (b) operational communication. His data, like the present findings, failed to support this hypothesis. Environmental change and all three forms of work related communication were found to be unrelated regardless of the level of leader approval (Table 1). The same pattern of findings was generally repeated when other measures of effectiveness were considered. Only among subunits with high levels of efficiency was environmental change observed to be positively related to intraunit communication ($r = .29$). This lone supportive finding was offset by evidence of a positive relationship between environmental change and intraunit communication among subunits with low community approval effectiveness ($r = .28$). Conditions in which frequent change is matched with frequent intraunit communication should

## TABLE 1
## Correlations Between Environmental Variables and Work Related Communication, Controlling for Four Measures of Subunit Effectiveness

| *Work Related Communication, Controlling on Effectiveness* | *Environmental Change* | | | *Environmental Complexity* | | |
|---|---|---|---|---|---|---|
| | *Total (N=90)* | *High*[a] *(Ns=42-47)* | *Low*[a] *(Ns=43-48)* | *Total (N=90)* | *High*[a] *(Ns=42-47)* | *Low*[a] *(NS=43-48)* |
| Leader approval | | | | | | |
| ES unit | .10 | .08 | .15 | −.15 | −.02 | −.26* |
| Regional office | .10 | .07 | .13 | −.16 | −.01 | −.28* |
| County sources | −.02 | −.01 | −.08 | −.02 | −.02 | −.00 |
| Goal attainment | | | | | | |
| ES unit | .10 | .17 | .02 | −.15 | −.29* | .05[c] |
| Regional office | .10 | .12 | .09 | −.16 | −.16 | −.14 |
| County sources | −.02 | .08 | −.11 | −.02 | .21 | −.06 |
| Community approval | | | | | | |
| ES unit | .10 | −.16 | .28*,[b] | −.15 | −.11 | −.20 |
| Regional office | .10 | .02 | .17 | −.16 | −.21 | −.12 |
| County sources | −.02 | .01 | −.01 | −.02 | .25* | −.16[b] |
| Efficiency | | | | | | |
| ES unit | .10 | .29* | −.02[c] | −.15 | −.26* | −.11 |
| Regional office | .10 | .04 | .17 | −.16 | −.14 | −.15 |
| County sources | −.02 | −.05 | −.03 | −.02 | −.08 | −.03 |

[a] *Ns* are unequal because of tied scores.

[b] Significant difference between high and low correlations, $p \leq .05$.

[c] Significant difference between high and low correlations, $p \leq .10$.

*$p \leq .05$, one-tailed test

not characterize relatively ineffective subunits. These data thus suggest that contrary to information processing and congruency notions, subunits do not attempt to reduce change induced uncertainty by increasing work related communication to any specific domain.

(2) By extending information processing ideas from environmental change to environmental complexity, it is reasonable to postulate that highly effective subunits will display positive relationships between complexity and communication and less effective units will demonstrate negative relationships. Across the four types of effectiveness, five significant ($p \leq .05$) relationships were found but only three were supportive of the hypothesized fit. Significant inverse relationships were observed between environmental complexity and (a) intraunit ($r = -.26$) and (b) regional office communication ($r = -.28$) among subunits with low leader approval. A positive relationship between complexity and county communication was noted among subunits with high community approval ($r = .25$). Significant findings opposite to those predicted occurred under conditions of high goal attainment and efficiency. They imply that high environmental complexity with its attendant uncertainty can be reduced through lower intraunit communication. In summary, as only 3 of 24 examinations of the congruency hypothesis based on environmental complexity were supportive, this hypothesized contingency must also be rejected.

(3) The small number of statistically significant findings makes the more rigorous moderator tests nearly superfluous. Nevertheless, the

analysis is presented for technical completeness and as a means of illustrating the more critical evaluation procedure. Correlations between each environmental variable and form of work related communication for subunits high in each type of effectiveness and for subunits low in the same type of effectiveness were compared and tested for significant differences or evidence of single group validity. Four correlations met the standards for single group validity, and two of these met the more rigorous requirement of statistically significant differences in the direction postulated. Single group validity was demonstrated in the relationship between environmental complexity and (a) intraunit communication and (b) regional office communication, using leader approval as the moderator. The two correlations meeting the additional standard involved completely different combinations of factors. Subunits high in community approval were significantly more likely to respond to high environmental complexity with frequent county source communication ($r = .25$) than subunits low in community approval ($r = -.16$). A similar set of relationships was evident among environmental change, intraunit communication, and efficiency. More efficient subunits engaged in more intraunit communication when environmental change was rapid ($r = .29$) than did inefficient units ($r = -.02$). By reporting a significant difference between the correlations under the high and low effectiveness conditions, greater confidence in the ability of a congruent combination of environmental conditions and communication practices to promote effectiveness was achieved. Unfortunately, only two such environmental-communication combinations were uncovered in this research.

## Summary and Discussion

A purpose of this study was to replicate Tushman's (1979b) examination of the relationships among environmental change, work related communication, and subunit effectiveness in a different sample and with a more rigorous data analysis procedure. Based on an information processing model of organizational communication, *it was hypothesized that a subunit would be more effective when its communication practices matched the level of uncertainty confronting the subunit.* Neither study found support for the notion that effectiveness could be enhanced by increasing communication under turbulent environmental conditions or by decreasing communication under stable conditions. In addition, the examination of a second environmental uncertainty condition (complexity) and multiple measures of effectiveness did not alter this conclusion. In short, the results of Tushman's initial study were found to be generalizable but opposite from those postulated on conceptual grounds.

Tushman's findings and those of this study suggest that a relatively simple two-way contingency (i.e., matching the uncertainty of environmental conditions with appropriate communication patterns) is not sufficient to explain variation in subunit effectiveness. Subsequent research may show that there are no systematic linkages among effectiveness, communication, and uncertainty, but such a conclusion probably is premature. Tushman (1979a, 1979b), for example, has generated more supportive findings for the information processing model through incorporation of subunit task variability as an additional measure of uncertainty. Task variability could not be considered in this study because the subunits did not demonstrate sufficient variance along this dimension. In addition, Tushman suggests certain refinements to his model (e.g., the reduction of uncertainty stemming from environmental variability may be more effectively handled by a few key boundary spanning individuals rather than by indiscriminate increases in external communication). These possibilities, as well as some others, warrant additional empirical investigation.

The issue of external communication with whom seems crucial for the reduction of environmental uncertainty. The present study considered only two external communication sources and not necessarily optimal ones for mitigating the effects of uncertainty. Communication with other Extension subunits or other organizations located within the subunit jurisdiction might have been more useful. Local government and social service organizations as well as private agrarian enterprises, for example, may be able to detect environmental fluctuations important to effectiveness (e.g., changes in the number of unemployed residents, emergence of new factors affecting market conditions) faster than can the Extension staff. In other words, subunits facing high uncertainty may be more effective if they establish and maintain a communication network that includes those intra- and inter-organizational sources that can best contribute to their understanding of the environment. Perhaps the present research and Tushman's (1979b) inquiry failed to yield supportive findings because they failed to include a critical communication source capable of providing valid and unique information to subunits functioning in uncertain settings. In sum, the "with whom" aspect of information processing requirements merits more consideration and perhaps also will serve to advance the study of a rather neglected topic, interorganizational (extra-organizational) communication.

Another alternative explanation for the nonsupportive findings in these studies involves the implicit assumption of the information processing model that subunits will use the information communicated to them to enhance their effectiveness. The lack of supportive evidence reported may be partially attributable to the existence of constraints or attributes that prohibit a subunit in an uncertain environment from responding appropriately to present conditions (e.g., government regulations limiting the extent of Extension operations, resistance to change among subunit leaders). Alternately expressed, subunits may be able to establish communication patterns highly consonant with their environmental needs but may sometimes be unable to take advantage of their congruent design. Similarly, there is no guarantee that the subunit in the simple, predictable environment will transfer resources that might be spent on communication to activities that would result in greater effectiveness. Case studies of information utilization by subunits and organizations might help assess the validity of this explanation and the degree to which it threatens the information processing model. Finally, it should be recognized that aspects of the model may be incomplete and that some elaboration or revision may be necessary in order to account for the findings reported by Tushman (1979b) and herein.

In summary, it is not recommended that the contingency or information processing approach be abandoned. Rather, the findings point to the need for greater specificity and elaboration in the study of communication design. Organizational communication has sorely lagged behind other organizational research topics in the formulation of conceptual frameworks useful in promoting empirical inquiry. The Tushman and Nadler (1978) model represents a long needed shot in the arm for the area and continues to be a viable source of testable hypotheses worthy of investigation. Even if the model and the general contingency approach are judged ultimately to be a hollow frontier for the study of organizational communication, the research stimulation resulting from its existence is likely to overshadow any misconceptions temporarily embraced concerning the nature of organizational and subunit communication.

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# SEX DISCRIMINATION AGAINST WOMEN IN INITIAL PLACEMENT DECISIONS: A LABORATORY INVESTIGATION[1]

M. SUSAN TAYLOR
University of Wisconsin, Madison
DANIEL R. ILGEN
Purdue University

A substantial body of evidence has documented the presence of sex discrimination against women within selection decisions made for traditionally male positions (Fidell, 1970; Jones, 1970; Shaw, 1972; Rosen & Jerdee, 1974a, 1974b, 1974c; Dipboye, Fromkin, & Wiback, 1975; Terborg & Ilgen, 1975; U.S. Equal Employment Opportunity Commission (EEOC), 1972). There also is much support for the existence of treatment discrimination in such positions, that is, discrimination against women in decisions made after employment (Levitin, Quinn, & Staines, 1971). Findings of treatment discrimination have been reported with respect to career development (Rosen & Jerdee, 1974c), promotion (Bryce, 1970; Day & Stogdill, 1972; Rosen & Jerdee, 1974b), and performance evaluation (Goldberg, 1968; Heilman, 1980).

However, the existence of one type of treatment discrimination has not been researched; that is the initial assignment given female employees entering traditionally male occupations. Within large work organizations, individuals frequently are not hired for a specific job but rather are placed according to the organization's needs at the time of entry. In such cases, past findings of treatment discrimination against females suggest that new female employees, to a greater extent than new male employees, will be viewed as more suitable for routine, low challenging positions than for stimulating, high challenging ones.

The existence of such discrimination would be unfortunate for at least two reasons. First, several researchers have reported evidence that the degree of challenge within individuals' early job assignments results in psychological effects that directly impact on performance levels of the individuals throughout their organizational careers (Berlew & Hall, 1966; Bray, Campbell, & Grant, 1974; Kaufman, 1974).

Second, Rosenbaum (1979) suggests that individuals' organizational careers are patterned after a "tournament model," with each job assignment being affected by those that precede it. His research found that early career stages were particularly important in determining future career opportunities. Rosenbaum's findings suggest that if females are placed in low challenge initial assignments, they would be expected to experience a low probability of reaching upper level organizational positions.

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Terborg and Ilgen (1975) argued that treatment discrimination may be less problematic than access discrimination because the influence of stereotypes on responses toward females should be less in treatment than in access situations. In particular, they argued that opportunities to observe a given female who is competent should provide more salient bases for evaluations than general stereotypic beliefs. The result should be less reliance on stereotypes for judging those females with whom an evaluator has worked for some time than for females who are new to the job. Unfortunately, initial placement decisions, although technically classified as treatment conditions, occur at a time when the evaluator is unfamiliar with the capabilities of the new employee. Therefore, responses are likely to be influenced more by stereotypes than other treatment responses later in the employee's tenure with the organization.

If, on the other hand, observation of other competent females generalizes to the new employee, then responses to placement decisions may be less discriminatory when evaluators have had such experiences. In this case, the experience may affect the stereotype itself. Some have argued that experience working with females does affect the stereotype (Bartol & Butterfield, 1974); others have argued that it does not (Terborg & Ilgen, 1975). The present research will investigate the experience effect on placement decisions.

## Hypotheses

Based on the preceding discussion, the present study investigated two hypotheses:

> *I. New female employees entering traditionally male occupations will be rated as more suitable for initial placement in positions of low challenge than for placement in highly challenging ones, whereas there will be no difference in the ratings given equally qualified, new male employees for high and low challenge positions.*
>
> *II. Persons who work with a competent, high performing female holding a traditionally male position, as compared to subjects who work with a competent, high performing male, will display less of a tendency to rate an unknown female candidate as more suitable for initial placement in a low challenge position than for placement in a high challenge one.*

## Method

*Procedure*—The present study utilized a managerial in-basket methodology centered around a corporate, personnel position within a fictitious work organization. Job duties included the selection and placement of professional and managerial employees. To simulate working with a competent female, the passage of time over six months was accomplished by dating the in-basket materials and arranging them in four one-month time segments (Table 1). Subjects were told that the in-basket would begin with their first day on a new job into which they were just promoted. After an initial orientation, they were given one large packet containing four individual envelopes labeled August, October, December, and February. They then were instructed to open the first packet and begin work. Subjects worked on the first time period materials (August) until completed, sealed their responses in an envelope, opened the second period packet (October), read attached transition material which explained what had happened over the two months, responded to the second set of items, sealed the envelope, etc., until all four time periods were completed. Following the completion of the last time period, all materials were returned and subjects were debriefed. The use of the individual packets for each subject allowed for the administration of the treatments to several people at one time. Packets with different treatment conditions (explained in detail below) were randomly assigned to participants.

**TABLE 1**
**Sequence of Manipulations**

| | *August* | *October* | *December* | *February* |
|---|---|---|---|---|
| Employment decisions encountered during the time period: | I. Placement I | none | II. Performance evaluation of Ellen/Allen Johnson | III. Placement II |
| Dependent variables: | 1. a. Placement ratings for challenging job.<br>b. Placement ratings for unchallenging job. | | Manipulation checks | 2. a. Placement rating for challenging job.<br>b. Placement rating for unchallenging job. |

*Subjects*—A total of 115 subjects enrolled in a large midwestern university provided data for the present study. Because some subjects failed to complete all of the information required for the in-basket items, the number of subjects varied somewhat from one decision to another. Of the subjects, 63 were males and 52 were females, with a mean age of 21. The majority of subjects (84) were business school students enrolled in upper level personnel courses. The remaining subjects (31) were students taking an introductory psychology course. No significant difference was found between the responses of the two groups, and they were combined for all analyses.

*Experimentally Manipulated Variables*—On two different occasions subjects were asked to evaluate four employees for placement on two positions. Because the two manipulations differed somewhat, placement decision I (made in the first time period) and placement decision II (made in the fourth period) are described separately in the following paragraphs.

*Placement I Decision*—Job challenge. Descriptions of two entry level sales positions were given to subjects. The positions were designed to portray one high and one low challenge job. Challenge was manipulated through use of the five motivating characteristics proposed by Hackman and Oldham (1975) as necessary for enriched jobs.

To check the challenge manipulation, subjects were asked to describe the jobs on two tailor-made scales. The first requested subjects' perceptions of the level of the five motivating job characteristics present in each position. These ratings were combined as recommended by Hackman and Oldham (1975) to yield an index of the job's motivational potential (MPS). The other measure asked how challenging subjects perceived each job to be. Comparisons of ratings given the two jobs revealed significantly higher ratings for the high challenge job on each measure (MPS: $t = 9.11$, $df = 109$, $p \leq .01$; challenge ratings: $t = 3.62$, $df = 104$, $p < .01$).

Sex of focal. Subjects were randomly assigned to evaluate either four male employees or three males and one female. The fourth employee, who varied in sex, hereafter will be termed the focal. Aside from differences in the sex and name of the focal, subjects in each condition received the same information about the four employees they were asked to evaluate.

Competence of focal. The initial concern was that the perceived competence level of focal person would interact with sex and influence the placement decisions. Therefore, two competence levels (high and average) were completely crossed with sex for focal employees. Subsequent analyses showed no interaction between competency levels and the sex of the focal, although, as expected, the above average focal was perceived as more suitable for both positions than was the average focal. No interactions existed, and data were collapsed across focal competence.

Sex of subject. Treatments were assigned to subjects such that sex of subject was randomly distributed across all treatments. Subsequent analyses showed no main effects or interactions between the sex of the subjects and the variables of interest. Therefore, data from male and female subjects were combined.

*Placement II Decision*—Job challenge. Job challenge was manipulated in the same manner described for the first decision except engineering position descriptions were utilized. Again, the manipulation checks revealed that the high challenge position received significantly higher MPS and challenge ratings than did the low challenge position (MPS: $t = 2.95$, $df = 102$, $p \leq .01$; challenge ratings: $t = 3.82$, $df = 104$, $p \leq .01$).

Observed employee. In the second packet (October), subjects were informed that their predecessor had hired a new employee for their working group and that this employee was now on the job. Subjects were told that the employee was either male (Allen Johnson) or female (Ellen Johnson). During the remainder of the in-basket exercise, subjects received several pieces of information about this employee, each of which portrayed a very competent person. It should be noted that this information was embedded within several other items that included favorable information about other employees all of whom were male. Manipulation checks collected in the form of a performance evalation during the third packet (December) showed that subjects were aware of the sex of their subordinates, that they perceived Allen/Ellen to be a high performer (7.7 on a 9-point scale), and that there was no difference in the perceived performance of Allen and Ellen ($\bar{X}_A = 7.94$, $\bar{X}_E = 7.64$, $t = 1.23$, $df = 104$, ns).

Sex of focal. The purpose of placement decision II was to determine whether or not the experience of working with a female versus a male employee would influence subjects' placement decisions about an unknown female employee. Therefore, sex of focal did not vary in placement decision II. All subjects evaluated a group of four employees, three males and one female (the focal), for placement in the two engineering positions.

*Dependent Variables*—The major dependent variable of interest was the placement rating given the focal employees with respect to positions that varied challenge. For each of the two placement decisions, subjects were asked to rate the suitability of four employees (a focal and three others) for placement on two jobs (a high and low challenge). Suitability was rated on a 9-point scale with anchors ranging from "strongly oppose for the position" to "strongly recommend for the position." The instructions for the scale asked subjects to obtain the best fit possible between employees' qualifications and job requirements.

## Results

Hypothesis I predicted that a new female employee, as compared to an equally qualified male employee, would be rated as more suitable for placement in a low rather than a high challenge position. This hypothesis was supported. Matched-pairs *t*-tests used to examine the hypothesis revealed that suitability ratings given to the male focal for the low and high challenge positions were not significantly different ($\bar{X}_{Lo} = 6.04$, $\bar{X}_{Hi} = 5.86$, $t = .73$, $df = 50$, ns). However, the female candidate was rated significantly higher for placement on the low challenge position than on the high challenge one ($X_{Lo} = 5.96$, $X_{Hi} = 5.51$, $t = 2.40$, $df = 49$, $p \leq .05$).

Hypothesis II proposed that subjects who worked with a female employee (Ellen Johnson) in their personnel units, versus those who worked with a male employee (Allen), would show less of a tendency to rate an unknown female employee as more suitable for a low rather than a high challenge position in a later placement decision. This hypothesis also was supported. Matched-pairs *t*-tests used to examine the hypothesis showed that those subjects working with Allen Johnson rated the female focal as significantly more suitable for the low challenge position than the high challenge one, ($\bar{X}_{Lo} = 6.00$, $\bar{X}_{Hi} = 5.54$, $t = 2.25$, $df = 50$, $p \leq .05$). However, those subjects who had a competent female assigned to their work group showed no significant difference between the suitability ratings given to the focal for the high versus the low challenge positions ($\overline{X}_{\text{Hi}} = 5.59$, $\overline{X}_{\text{Lo}} = 5.55$, $t = .23$, $df = 50$, ns).

## Discussion

To the extent that these data generalize to field settings, they are both discouraging and encouraging. On the discouraging side, the data indicate that both males and females, when asked to make placement decisions, are more likely to see females as more suitably placed in unchallenging rather than challenging positions. Previous research has demonstrated the long term career benefits of obtaining challenging positions early in one's career (Berlew & Hall, 1966; Rosenbaum, 1979). Therefore, although both social and legal pressures have tended to increase the probability of fair treatment in hiring for women, discrimination with respect to placement still may occur. This more subtle form of discrimination may affect careers in the long run but go unnoticed early in a career both by employers and by female employees.

The encouraging finding is that the experience of working with and observing competent females reduced the extent to which other females placed on jobs at some future point in time were seen as more suitable for low as compared to high challenge positions. Although past research has shown that working with competent females leads to less stereotypic behavior (Terborg & Ilgen, 1975), two explanations for this observed effect existed. People may either change their stereotypic views of women or they may maintain the stereotype and treat the specific female as an exception. In the present research, the latter effect cannot be eliminated, but it can be said that the data support the notion that the stereotypes change. Those who were assigned competent females for their work group responded less stereotypically to other females. The implication is that the stereotype was affected. These results are consistent with the growing evidence that the high visibility of successful women may have positive effects on the careers of other females (Bartol & Butterfield, 1974; Heilman, 1980). Unfortunately, one would also expect highly visible, unsuccessful females to impact negatively on the career development of other women.

Future research should focus on field replications of the findings of placement discrimination against females in traditionally male occupations. However, a far more pressing research need concerns the importance of investigating the impact that highly visible, well established, successful women have on the motivation and career opportunities of other females within the organizational structure.

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# A COMMENT ON THE DIMENSIONALITY AND RELIABILITY OF THE WOMEN AS MANAGERS SCALE (WAMS)[1]

**MICHAEL D. CRINO**
**MICHAEL C. WHITE**
**Louisiana State University**
**GERRY L. DeSANCTIS**
**Texas Tech University**

The Women as Managers Scale (WAMS), reported to be a measure of stereotypic attitudes toward women in management, has appeared in recent literature as both an independent and a dependent variable. Examples include Garland and Price (1977), Terborg and Ilgen (1975), Cohen and Leavengood (1978), and Stevens and DeNisi (1980).

The purpose of this paper is to call attention to recent evidence indicating the possibility of differential subgroup reliability and dimensionality for the WAMS. This study was considered a routine prelude to a much more complete study of worker attitudes toward women. The following results have caused the authors to reassess the use of the WAMS for the study and subject sample.

## Method

*Subjects*—A student sample ($N=1{,}014$) was drawn from 14 lecture classes in a college of business administration. A managerial sample ($N=602$) was composed of managerial personnel who either were employed by the university or were registered at the university as managers interested in management oriented courses.

Student sample. Questionnaires containing the WAMS (Terborg, Peters, Ilgen, & Smith, 1977) and various demographic items were distributed during class. Students completed the questionnaires on a voluntary basis. They were told that all participants would remain anonymous. Participation rates across classes were uniformly high (90 percent-95 percent).

Manager sample. Questionnaires containing the WAMS (Terborg et al., 1977), as well as items dealing with various demographic data were mailed to individuals who were classified as managerial either by their employers, university records, or self-report (registration with the university) ($N=1{,}030$). Of these, 58 percent provided usable data by return mail ($N=602$).

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## TABLE 1
## Selected Characteristics of Subject Samples

| | Managers | | | | Students | | |
|---|---|---|---|---|---|---|---|
| Sex | Average WAMS Score | Average Age | Average Number of Years of Full Time Work Experience | Average Number of Employees Directly Supervised | Average WAMS Score | Average Age | Average Number of Months of Full Time Work Experience |
| Male | 111.26 | 39.12 | 18.96 | 30.81 | 103.10 | 21.71 | 39.06 |
| Female | 128.36 | 36.71 | 13.00 | 31.48 | 129.65 | 21.25 | 26.45 |
| Combined | 122.80 | 37.76 | 14.97 | 31.26 | 112.24 | 21.54 | 35.63 |

Table 1 provides age and work experience data for both the managerial and student samples. It is important to note that the managerial sample had an average of 15 years of full time work experience and direct supervisory responsibility for an average of 31 employees.

*Procedure*—Responses to the WAMS were coded and recoded when necessary for consistency as suggested by Terborg et al. (1977). Odd/even estimates of reliability were computed consistent with the generation of the initial developmental estimate of instrument reliability (Peters, Terborg, & Taynor, 1974) reported formally in the published literature (Terborg et al., 1977). Estimates were generated for the total sample ($N$=1,576) as well as for groups (managers, $N$=602; students, $N$=1,014) and subgroups by sex of respondent. Each estimate then was corrected for length through the Spearman-Brown correction formula.

Confidence intervals (95 percent level of confidence) were generated around each corrected point estimate (Neter & Wasserman, 1974) in order to provide data that would allow for comparisons of estimates between studies and between groups and subgroups within this study.

Principal components analyses (unities in the main diagonal) then were conducted on the interitem correlation matrices for the total (combined samples), for each sample separately (managers and students), and subsamples by sex within each sample. This approach was taken in an attempt to define the underlying dimensionality of the WAMS. It should be noted that Peters et al. (1974), although originally developing and defining three underlying orthogonal dimensions, more recently have treated the instrument as though it were unidimensional (Terborg et al., 1977). Other researchers have accepted this unidimensionality in subsequent research (Cohen & Leavengood, 1978; Garland & Price, 1977; Stevens & DeNisi, 1980).

### Results

*Reliability*—Table 2 presents comparative data for the estimates of reliability. All three studies cited had similar point estimates and confidence

## TABLE 2
## Confidence Interval Comparisons for Reliability Estimes—WAMS

| *Study* | *Sample Characteristics* | *Size* | *Corrected Split-Half Estimate* | *95% Confidence Interval*[a] |
|---|---|---|---|---|
| Peters et al. (1974) | Males | 345 | not published | |
| | Females | 196 | not published | |
| | Total | 541 | .91 | (.90 – .92) |
| Terborg et al. (1977) | Males | 180 | not published | |
| | Females | 100 | not published | |
| | Total | 280 | .92 | (.90 – .94) |
| This study[b] (1980) | Male students | 654 | .91 | (.9003 – .9255) |
| | Female students | 350 | .85 | (.8213 – .8794) |
| | Total students[c] | 1,014 | .94 | (.9302 – .9447) |
| | Male managers | 200 | .93 | (.9085 – .9466) |
| | Female managers | 396 | .86 | (.8340 – .8850) |
| | Total managers | 602 | .91 | (.9014 – .9274) |
| | Total male subsample | 854 | .92 | (.9092 – .9298) |
| | Total female subsample | 746 | .86 | (.8367 – .8740) |
| | Total sample | 1,616 | .93 | (.9262 – .9389) |

[a] Item 16 was removed from the analysis through a random determination in order to secure an odd/even estimate of internal consistency.

[b] Confidence intervals generated through $Z'$ transformation (Neter & Wasserman, 1974).

[c] Missing data (respondent sex) cause totals to be greater than subsample sums.

intervals for the total subject samples. However, these split half reliability data indicate that the WAMS may be a more reliable ($\alpha = .05$) measure for students than for managers. Similarly, the instrument appears to be more reliable for males than for females both within and across samples.

*Dimensionality*—Principal components analyses. Tables 3, 4, and 5 present factor eigenvalues as defined by principal components analyses of the responses from the total combined sample; student sample; manager sample (Table 3); female and male subsamples (Table 4); as well as the student and manager samples by sex (Table 5).

Note that for each sample and subsample the eigenvalues (latent root approach) indicate at least three, and sometimes more, dimensions (principal components). These data are inconsistent with a unidimensional treatment of the instrument. Hair, Anderson, Tatham, and Grablowsky (1979) take the position that the latent root approach is more reliable and somewhat conservative when the number of items are between 20 and 50. Further, they state that the scree test (Catell, 1960) has a tendency to result in one, two, or three more factors than the latent root criterion. As a consequence, the latent root approach was favored for this paper.

Tables 6, 7, and 8 present comparisons of the first three principal components for each sample and subsample from this study with the dimensions developed in the original Peters et al. (1974) study. Note that in only a few instances do the factor loadings approximate the dimensions as originally specified (Peters et al., 1974).

## TABLE 3
## Eigenvalues for Principal Components Analyses—Total Sample, Student Sample, Manager Sample[a]

| | Total Sample | | | Student Sample | | | Manager Sample | | |
|---|---|---|---|---|---|---|---|---|---|
| | Eigenvalue | % of Variance | Cumulative % | Eigenvalue | % of Variance | Cumulative % | Eigenvalue | % of Variance | Cumulative % |
| 1 | 8.60 | 41.0 | 41.0 | 8.75 | 41.7 | 41.7 | 7.72 | 36.8 | 36.8 |
| 2 | 1.39 | 6.6 | 47.6 | 1.29 | 6.2 | 47.8 | 1.68 | 8.0 | 44.8 |
| 3 | 1.21 | 5.8 | 53.4 | 1.18 | 5.7 | 53.5 | 1.31 | 6.3 | 51.1 |
| 4 | .84 | 4.0 | 57.4 | .83 | 4.0 | 57.5 | 1.00 | 4.8 | 55.9 |
| 5 | .78 | 3.7 | 61.1 | .80 | 3.8 | 61.3 | .89 | 4.2 | 60.1 |
| 6 | .73 | 3.5 | 64.6 | .73 | 3.5 | 64.8 | .85 | 4.1 | 64.2 |
| 7 | .67 | 3.2 | 67.9 | .67 | 3.2 | 68.0 | .79 | 3.8 | 68.0 |
| 8 | .64 | 3.1 | 70.9 | .62 | 3.0 | 71.0 | .69 | 3.3 | 71.3 |
| 9 | .62 | 3.0 | 73.9 | .61 | 2.9 | 73.9 | .66 | 3.2 | 74.5 |
| 10 | .60 | 2.9 | 76.8 | .60 | 2.9 | 76.8 | .62 | 3.0 | 77.5 |
| 11 | .57 | 2.7 | 79.5 | .58 | 2.8 | 79.6 | .58 | 2.8 | 80.3 |
| 12 | .55 | 2.6 | 82.2 | .57 | 2.7 | 82.3 | .54 | 2.6 | 82.9 |
| 13 | .51 | 2.4 | 84.6 | .52 | 2.5 | 84.8 | .50 | 2.4 | 85.3 |
| 14 | .50 | 2.4 | 87.0 | .51 | 2.4 | 87.3 | .48 | 2.3 | 87.6 |
| 15 | .48 | 2.3 | 89.3 | .47 | 2.3 | 89.5 | .46 | 2.2 | 89.8 |
| 16 | .43 | 2.1 | 91.3 | .45 | 2.2 | 91.7 | .43 | 2.1 | 91.9 |
| 17 | .40 | 1.9 | 93.3 | .42 | 2.0 | 93.7 | .41 | 2.0 | 93.9 |
| 18 | .40 | 1.9 | 95.2 | .38 | 1.8 | 95.5 | .37 | 1.8 | 95.6 |
| 19 | .36 | 1.7 | 96.9 | .34 | 1.6 | 97.2 | .34 | 1.6 | 97.3 |
| 20 | .33 | 1.6 | 98.6 | .30 | 1.5 | 98.6 | .31 | 1.5 | 98.8 |
| 21 | .30 | 1.4 | 100.0 | .28 | 1.4 | 100.0 | .25 | 1.2 | 100.0 |

[a] Sample sizes can be found in Table 2.

## TABLE 4
## Eigenvalues for Principal Components Analyses—Male Sample, Female Sample[a]

| | *Females* | | | *Males* | | |
|---|---|---|---|---|---|---|
| *Factor* | *Eigenvalue* | *% of Variance* | *Cumulative %* | *Eigenvalue* | *% of Variance* | *Cumulative %* |
| 1 | 5.55 | 26.5 | 26.5 | 7.53 | 35.9 | 35.9 |
| 2 | 1.92 | 9.1 | 35.6 | 1.42 | 6.8 | 42.7 |
| 3 | 1.43 | 6.9 | 42.5 | 1.28 | 6.1 | 48.8 |
| 4 | 1.10 | 5.2 | 47.7 | .94 | 4.5 | 53.3 |
| 5 | 1.07 | 5.1 | 52.8 | .92 | 4.4 | 57.7 |
| 6 | .95 | 4.6 | 57.4 | .79 | 3.8 | 61.5 |
| 7 | .85 | 4.1 | 61.4 | .74 | 3.6 | 65.0 |
| 8 | .80 | 3.9 | 65.3 | .72 | 3.5 | 68.5 |
| 9 | .78 | 3.7 | 69.0 | .67 | 3.2 | 71.7 |
| 10 | .75 | 3.6 | 72.6 | .65 | 3.1 | 74.8 |
| 11 | .72 | 3.5 | 76.1 | .62 | 3.0 | 77.8 |
| 12 | .70 | 3.3 | 79.4 | .61 | 2.9 | 80.7 |
| 13 | .64 | 3.1 | 82.5 | .58 | 2.8 | 83.5 |
| 14 | .58 | 2.8 | 85.3 | .53 | 2.6 | 86.1 |
| 15 | .55 | 2.7 | 87.9 | .50 | 2.4 | 88.5 |
| 16 | .54 | 2.6 | 90.5 | .47 | 2.3 | 90.7 |
| 17 | .44 | 2.1 | 92.6 | .44 | 2.1 | 92.9 |
| 18 | .42 | 2.0 | 94.7 | .43 | 2.1 | 95.0 |
| 19 | .41 | 2.0 | 96.6 | .40 | 1.9 | 96.9 |
| 20 | .38 | 1.8 | 98.5 | .35 | 1.7 | 98.6 |
| 21 | .31 | 1.5 | 100.0 | .29 | 1.4 | 100.0 |

[a]Sample sizes can be found in Table 2.

Factor congruency estimates. Tables 9 and 10 present factor congruency estimates for cross sample comparisons, as well as subsample comparisons by sex (Harman, 1960). These data indicate that reasonable congruence exists between the factor solution for the total managerial and student subsamples and for the managerial male and student male subsamples (Table 9). However, an interesting contrast appears when comparing factor structures for managerial female and student female subsamples. These congruence estimates are very low, ranging from .48 to .60, supporting the proposition that managerial and student females respond very differently to the instrument.

Low factor structure correspondence also exists between male and female subsamples within both the managerial sample and the student sample (Table 10). The only exception is the high degree of congruence for the traits factor (.91) within the student sample.

### Discussion

Given the recent use of the WAMS as a unidimensional attitude measure, it should be of some concern that the instrument reliability

# TABLE 5
## Eigenvalues for Principal Components Analyses—Subsample by Sex[a]

| | *Student Sample* | | | | | | *Managers Sample* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *Males* | | | *Females* | | | *Males* | | | *Females* | | |
| *Factor* | *Eigenvalue* | *% of Variance* | *Cumulative %* | *Eigenvalue* | *% of Variance* | *Cumulative %* | *Eigenvalue* | *% of Variance* | *Cumulative %* | *Eigenvalue* | *% of Variance* | *Cumulative %* |
| 1 | 7.13 | 34.0 | 34.0 | 5.25 | 25.0 | 25.0 | 8.44 | 40.2 | 40.2 | 5.86 | 27.9 | 27.9 |
| 2 | 1.43 | 6.9 | 40.8 | 2.00 | 9.5 | 34.6 | 1.57 | 7.5 | 47.7 | 1.96 | 9.3 | 37.3 |
| 3 | 1.32 | 6.3 | 47.1 | 1.52 | 7.3 | 41.8 | 1.32 | 6.3 | 54.1 | 1.45 | 6.9 | 44.2 |
| 4 | .99 | 4.7 | 51.9 | 1.18 | 5.6 | 47.4 | .96 | 4.6 | 58.7 | 1.26 | 6.0 | 50.2 |
| 5 | .96 | 4.6 | 56.5 | 1.07 | 5.1 | 52.6 | .90 | 4.3 | 63.0 | 1.12 | 5.4 | 55.6 |
| 6 | .80 | 3.8 | 60.3 | .98 | 4.7 | 57.3 | .86 | 4.1 | 67.1 | 1.01 | 4.8 | 60.4 |
| 7 | .78 | 3.8 | 64.0 | .90 | 4.3 | 61.6 | .81 | 3.9 | 71.0 | .93 | 4.4 | 64.8 |
| 8 | .75 | 3.6 | 76.6 | .85 | 4.1 | 65.6 | .66 | 3.2 | 74.2 | .75 | 3.6 | 68.4 |
| 9 | .71 | 3.4 | 71.0 | .84 | 4.0 | 69.7 | .64 | 3.1 | 77.2 | .73 | 3.5 | 71.9 |
| 10 | .68 | 3.3 | 74.3 | .83 | 4.0 | 73.6 | .58 | 2.8 | 80.0 | .72 | 3.4 | 75.4 |
| 11 | .66 | 3.2 | 77.5 | .75 | 3.6 | 77.3 | .55 | 2.6 | 82.7 | .71 | 3.4 | 78.8 |
| 12 | .63 | 3.0 | 80.5 | .66 | 3.2 | 80.4 | .51 | 2.4 | 85.1 | .62 | 3.0 | 81.7 |
| 13 | .61 | 2.9 | 83.4 | .61 | 2.9 | 83.3 | .49 | 2.4 | 87.5 | .59 | 2.8 | 84.6 |
| 14 | .54 | 2.6 | 86.0 | .58 | 2.8 | 86.1 | .46 | 2.2 | 89.7 | .56 | 2.7 | 87.2 |
| 15 | .51 | 2.5 | 88.5 | .55 | 2.7 | 88.8 | .44 | 2.1 | 91.8 | .51 | 2.5 | 89.7 |
| 16 | .49 | 2.4 | 90.8 | .49 | 2.4 | 91.2 | .38 | 1.8 | 93.6 | .48 | 2.3 | 92.0 |
| 17 | .47 | 2.3 | 93.1 | .44 | 2.1 | 93.3 | .35 | 1.7 | 95.3 | .41 | 2.0 | 94.0 |
| 18 | .42 | 2.0 | 95.1 | .41 | 2.0 | 95.3 | .29 | 1.4 | 96.7 | .38 | 1.8 | 95.8 |
| 19 | .39 | 1.9 | 97.0 | .37 | 1.8 | 97.1 | .28 | 1.3 | 98.1 | .36 | 1.7 | 97.5 |
| 20 | .34 | 1.6 | 98.6 | .35 | 1.7 | 98.8 | .23 | 1.1 | 99.2 | .27 | 1.3 | 98.8 |
| 21 | .28 | 1.4 | 100.0 | .25 | 1.2 | 100.0 | .17 | .8 | 100.0 | .25 | 1.2 | 100.0 |

[a] Sample sizes can be found in Table 2.

## TABLE 6
## Principal Components Factor Analysis with Varimax Rotation—WAMS[a]

| Original Peters et al. Factor Solution by Item | | Total Sample | | | Student Sample | | | Manager Sample | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | I | II | III | I | II | III | I | II | III |
| Acceptance of women into managerial positions | 1 | .41 | .36 | .40 | .68 | .01 | .06 | .32 | .34 | .40 |
| | 2 | .32 | .35 | .37 | .60 | .02 | .01 | .48 | .32 | .21 |
| | 3 | .41 | .26 | .33 | .58 | −.09 | −.01 | .34 | .22 | .38 |
| | 4 | .21 | .57 | .22 | .57 | −.28 | −.15 | .26 | .54 | .17 |
| | 5 | .29 | .56 | .26 | .63 | .17 | −.16 | .33 | .58 | .19 |
| | 6 | .42 | .43 | .37 | .70 | .00 | −.06 | .43 | .44 | .33 |
| | 7 | .27 | .38 | .43 | .63 | .09 | .09 | −.39 | .38 | .19 |
| | 8 | .19 | .74 | .25 | .67 | .36 | −.16 | .24 | .79 | .13 |
| | 9 | .26 | .68 | .18 | .67 | .32 | −.24 | .13 | .65 | .21 |
| | 10 | .19 | .55 | .31 | .62 | .26 | .00 | .24 | .58 | .15 |
| Female-specific barriers | 11 | .15 | .21 | .63 | .51 | .11 | .36 | .65 | .18 | .16 |
| | 12 | .28 | .21 | .63 | .61 | −.05 | .34 | .65 | .24 | .23 |
| | 13 | .25 | .28 | .62 | .62 | .05 | .29 | .67 | .29 | .19 |
| | 14 | .19 | .25 | .56 | .56 | .03 | .28 | .55 | .27 | .09 |
| | 15 | .27 | .14 | .39 | .43 | .07 | .11 | .42 | .10 | .24 |
| Traits necessary for managerial success | 16 | .49 | .21 | .25 | .56 | −.20 | −.08 | .34 | .21 | .44 |
| | 17 | .67 | .19 | .16 | .64 | −.28 | −.20 | .16 | .10 | .65 |
| | 18 | .68 | .25 | .28 | .76 | −.31 | −.12 | .27 | .22 | .58 |
| | 19 | .38 | .25 | .38 | .61 | −.10 | .03 | .43 | .22 | .27 |
| | 20 | .68 | .22 | .22 | .72 | −.27 | −.08 | .14 | .15 | .67 |
| | 21 | .68 | .22 | .23 | .70 | −.26 | −.09 | .14 | .17 | .71 |
| Eigenvalue | | 8.60 | 1.39 | 1.21 | 8.75 | 1.29 | 1.19 | 7.72 | 1.69 | 1.31 |
| Percent variance explained | | 41% | 7% | 6% | 42% | 6% | 6% | 37% | 8% | 6% |
| Cumulative percentage of variance explained | | 41% | 48% | 53% | 42% | 48% | 54% | 37% | 45% | 51% |

[a] Factor loadings of .3 and above are underscored.

estimates for males and females within and across both samples (managers, students) as well as for managers and students (total) differ when compared at conventional levels of significance ($\alpha = .05$). Depending on the researcher's purpose (i.e., prediction, theoretical causality), and hence the appropriateness of attenuation correction, this differential reliability may require slightly different attenuation corrections for different groups (Bohrnstedt, 1970).

More importantly, the primary cause of the differential reliability reported here appears to be nonhomogeneity of variance. Although both the *F* and *t* tests are rather robust with reference to moderate departures from the homogeneity of variance assumption (assuming equal sample sizes), failure to attend to such departures with unequal sample sizes can

## TABLE 7
## Principal Components Factor Analysis by Sex with Varimax Rotation—WAMS[a]

| | | Male Subsample | | | Female Subsample | | |
|---|---|---|---|---|---|---|---|
| *Original Peters et al. Factor Solution by Item* | | *I* | *II* | *III* | *I* | *II* | *III* |
| Acceptance of women into managerial positions | 1 | .34 | .36 | .37 | .39 | .21 | .22 |
| | 2 | .29 | .33 | .31 | .26 | .31 | .28 |
| | 3 | .41 | .19 | .28 | .29 | .19 | .17 |
| | 4 | .17 | .58 | .20 | .15 | .54 | .11 |
| | 5 | .28 | .57 | .19 | .18 | .53 | .15 |
| | 6 | .43 | .37 | .36 | .32 | .46 | .23 |
| | 7 | .26 | .34 | .47 | .19 | .34 | .28 |
| | 8 | .21 | .68 | .26 | .04 | .78 | .28 |
| | 9 | .29 | .67 | .14 | .10 | .65 | .08 |
| | 10 | .20 | .53 | .29 | .09 | .50 | .29 |
| Female-specific barriers | 11 | .08 | .13 | .52 | .07 | .16 | .58 |
| | 12 | .26 | .14 | .62 | .19 | .15 | .56 |
| | 13 | .20 | .25 | .53 | .14 | .16 | .58 |
| | 14 | .13 | .18 | .47 | .12 | .22 | .51 |
| | 15 | .23 | .10 | .27 | .21 | .05 | .30 |
| | 16 | .49 | .19 | .20 | .44 | .17 | .20 |
| Traits necessary for managerial success | 17 | .62 | .23 | .10 | .71 | .05 | .06 |
| | 18 | .69 | .23 | .26 | .64 | .12 | .13 |
| | 19 | .35 | .28 | .33 | .32 | .11 | .26 |
| | 20 | .70 | .22 | .17 | .60 | .11 | .14 |
| | 21 | .69 | .22 | .23 | .61 | .11 | .12 |
| Eigenvalue | | 7.54 | 1.43 | 1.28 | 5.56 | 1.92 | 1.44 |
| Percentage of variance explained | | 36% | 7% | 6% | 27% | 9% | 7% |
| Cumulative percentage of variance explained | | 36% | 43% | 49% | 27% | 36% | 43% |

[a] Factor loadings of .3 and above are underscored.

seriously compromise the alpha level that a researcher believes was predetermined (Cochran & Cox, 1957). For example, a computed significance level of .05 may in reality be less or greater, depending on the degree to which the assumption was violated relative to the "magnitude and differences in sample sizes" (Winer, 1971, p. 38). In this study the distribution is shifted to the right (probability of type I error is greater than $\alpha$) for comparisons between male and female students, and to the left (probability of type I error is less than $\alpha$) for comparisons between male and female managers (Glass & Stanley, 1970). Analyses of the group standard deviations reported in Table 11 indicate that the homogeneity of variance assumption would be violated for any of the comparisons among independent groups. It appears that heterogeneity of variance is very likely to occur between groups routinely used in conjunction with the WAMS (i.e., managers, students, males, females). Hence, researchers should be especially sensitive to violations of the remaining assumptions underlying *t* and *F* tests when using the WAMS. These tests are robust with reference to the violation of

## TABLE 8
## Principal Components Factor Analysis by Subsample with Varimax Rotation—WAMS[a]

| | | Student Sample | | | | | | Manager Sample | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Male | | | Female | | | Male | | | Female | | |
| *Original Peters et al. Factor Solution by Item* | | *I* | *II* | *III* | *I* | *II* | *III* | *I* | *II* | *III* | *I* | *II* | *III* |
| Acceptance of women into managerial positions | 1 | .31 | .34 | .40 | .17 | .40 | .20 | .39 | .44 | .23 | .41 | .24 | .22 |
| | 2 | .33 | .33 | .27 | .30 | .25 | .17 | .37 | .19 | .42 | .22 | .43 | .25 |
| | 3 | .40 | .18 | .25 | .25 | .25 | .16 | .23 | .49 | .30 | .33 | .21 | .11 |
| | 4 | .18 | .54 | .19 | .61 | .01 | .10 | .70 | .14 | .16 | .19 | .25 | .40 |
| | 5 | .30 | .53 | .18 | .51 | .14 | .10 | .69 | .23 | .18 | .19 | .31 | .43 |
| | 6 | .46 | .34 | .34 | .52 | .25 | .10 | .50 | .33 | .36 | .36 | .35 | .39 |
| | 7 | .26 | .30 | .47 | .40 | .27 | .22 | .48 | .23 | .38 | .18 | .31 | .29 |
| | 8 | .21 | .65 | .23 | .77 | .04 | .16 | .73 | .26 | .27 | .04 | .15 | .83 |
| | 9 | .25 | .73 | .11 | .61 | .09 | .13 | .51 | .49 | .21 | .12 | .04 | .73 |
| | 10 | .17 | .51 | .30 | .45 | .13 | .45 | .60 | .29 | .23 | .06 | .20 | .55 |
| Female-specific barriers | 11 | .06 | .10 | .45 | .20 | −.03 | .57 | .22 | .10 | .66 | .18 | .55 | .12 |
| | 12 | .25 | .09 | .61 | .12 | .21 | .50 | .32 | .30 | .58 | .17 | .60 | .15 |
| | 13 | .18 | .21 | .49 | .15 | .14 | .51 | .37 | .28 | .56 | .11 | .64 | .18 |
| | 14 | .14 | .16 | .45 | .14 | .22 | .55 | .12 | .06 | .54 | .08 | .52 | .27 |
| | 15 | .22 | .10 | .23 | .04 | .25 | .26 | .00 | .26 | .41 | .24 | .31 | .06 |
| Traits necessary for managerial success | 16 | .54 | .17 | .15 | .13 | .31 | .21 | .22 | .41 | .33 | .48 | .27 | .16 |
| | 17 | .62 | .23 | .08 | .10 | .80 | .00 | .18 | .70 | .14 | .65 | .13 | .03 |
| | 18 | .71 | .20 | .26 | .12 | .78 | .00 | .32 | .61 | .17 | .56 | .23 | .11 |
| | 19 | .37 | .23 | .29 | .12 | .38 | .17 | .46 | .29 | .34 | .23 | .40 | .06 |
| | 20 | .71 | .21 | .18 | .09 | .41 | .40 | .20 | .62 | .17 | .68 | .11 | .13 |
| | 21 | .68 | .23 | .26 | .06 | .44 | .22 | .19 | .72 | .12 | .68 | .11 | .13 |
| Eigenvalue | | 7.14 | 1.44 | 1.32 | 5.25 | 2.00 | 1.521 | 8.45 | 1.58 | 1.33 | 5.87 | 1.96 | 1.46 |
| Percent variance explained | | 34% | 7% | 6% | 25% | 10% | 7% | 40% | 8% | 6% | 28% | 9% | 7% |
| Cumulative percentage of variance explained | | 34% | 41% | 47% | 25% | 35% | 42% | 40% | 48% | 54% | 28% | 37% | 44% |

[a] Factor loadings of .3 and above are underscored.

## TABLE 9
## Cross Sample Factor Congruency Estimates

| *Comparison* | *Original Factor*<br>*Acceptance of Women into Business* | <br>*Female-Specific Barriers* | <br>*Traits Necessary for Managerial Success* |
|---|---|---|---|
| Managerial sample and student sample | .75 | .99 | .72 |
| Managerial males and student males | .70 | .74 | .96 |
| Managerial females and student females | .48 | .60 | .59 |

## TABLE 10
## Subsample Factor Congruency Estimates

| *Comparison* | *Original Factor*<br>*Acceptance of Women into Business* | <br>*Female-Specific Barriers* | <br>*Traits Necessary for Managerial Success* |
|---|---|---|---|
| Combined sample, males and females | .98 | .97 | .97 |
| Student males and student females | .59 | .57 | .91 |
| Manager males and manager females | .60 | .63 | .64 |

## TABLE 11
## Summary of Psychometric Properties: WAMS

| *Subject Sample* | *Sample Size* | *Mean*[a] | *Standard Deviation* | *Corrected Split-Half Reliability* | *Dimensionality (Principal Components)* |
|---|---|---|---|---|---|
| Managers | 602 | 122.08 | 19.05 | .91 | 4 |
| Male managers | 200 | 111.26 | 20.79 | .93 | 3 |
| Female managers | 396 | 128.36 | 15.02 | .86 | 6 |
| Students | 1,014 | 112.24 | 21.11 | .94 | 3 |
| Male students | 654 | 103.10 | 18.66 | .91 | 3 |
| Female students | 350 | 129.65 | 12.51 | .85 | 5 |
| Males | 854 | 104.84 | 19.47 | .92 | 3 |
| Females | 746 | 129.08 | 13.88 | .86 | 5 |
| Total | 1,616 | 115.99 | 20.98 | .93 | 3 |

[a] All possible mean value comparisons (adjusted for heterogeneity of variance) among independent groups (except the female manager/female student comparison) may be considered different ($p < .001$).

individual assumptions, but multiple violations should be of considerable concern to researchers.

In addition, the underlying dimensionality of the WAMS is problematic. Principal components analyses indicate that although there often is one dominant dimension, there also are from two to five minor components, depending on the characteristics of the sample. The wide range of factor congruency estimates for the first three rotated (varimax) principal components (.48 to .99) offer little additional comfort. It may be that the dimensionality of the construct measured by the WAMS is unstable across samples or, alternatively, that the dimensionality of the contruct is stable and that the WAMS fails to capture it consistently across samples. In any event, these data raise the question of just what the WAMS measures. There is evidence inconsistent with the notion that the WAMS measures a unidimensional construct (principal components), or that it consistently captures the original three components that figured prominently in its early development (Tables 6-8), or even that it measures the same components from sample to sample (factor congruency estimates).

Hence, an uncritical off-the-shelf acceptance and use of the WAMS may be unjustified. It is important that researchers satisfy themselves as to the appropriateness of the WAMS for their research. The results reported here are from only one study, yet they should be sufficient to encourage a continued examination of the psychometric properties of the WAMS until the weight of empirical evidence is sufficient to define those properties more specifically.

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# NOTES ABOUT AUTHORS

*Donald W. Beard* is an Assistant Professor of Business Policy at the University of Washington (Graduate School of Business Administration, Department of Management and Organization, University of Washington, Seattle, WA 98195). He received his Ph.D. degree from the University of Nebraska, an M.B.A. degree from Harvard University, and a B.A. degree from Northwestern University. Dr. Beard has had extensive full time experience in both management and management consulting with major United States corporations. His research interests include relationships among organizational environments, strategy, structure, and performance and applications of quantitative models in strategic decision making.

*Anthony F. Campagna* is an Associate Professor of Labor and Human Resources in the College of Administrative Science at Ohio State University. He also holds joint appointments with the School of Public Administration and the Faculty of Management Sciences. He received his Ph.D. from the University of California at Los Angeles. Dr. Campagna's current research projects include studies in human resource administration, employment relations in both the private and public sectors, and public policy and labor law.

*Richard A. Cosier* is an Associate Professor of Management at Indiana University (Graduate School of Business, Indiana University, Bloomington, IN 47405). He received his Ph.D. from The University of Iowa in 1976. He formerly was a planning engineer with the Western Electric Company and Instructor of Management and Quantitative Methods at the University of Notre Dame. He has published in several major journals and presented numerous papers at professional meetings. He has been active in many executive development programs and has acted as a management education consultant for several organizations.

*Michael D. Crino* received his Ph.D. in management from the University of Florida and is an Assistant Professor of Management at Louisiana State University, Baton Rouge, LA. His research interests are in the areas of personnel and organizational behavior. His publications have appeared in *Management International Review, Personnel Psychology, Psychological Reports, Employee Relations Law Journal*, and other journals.

*Gerry L. DeSanctis* is a doctoral student in management at Texas Tech University. She received her bachelor's degree from Villanova University in 1975 and a master's degree in Psychology from Fairleigh Dickinson University in 1977.

*Gregory G. Dess* is an Assistant Professor of Management at the University of South Carolina. He received his Ph.D. in Business Administration from the University of Washington in Seattle in 1980. His present research interests include the conceptualization and measurement of organizational environments and their implications for business policy and strategic planning. He is a member of the Academy of Management and the American Institute for Decision Sciences and has presented papers at the national meetings of both organizations.

*Peter W. Dorfman* is an Associate Professor of Management at New Mexico State University. He received his Ph.D. degree in Psychology from the University of Maryland. His present research interests focus on the performance evaluation process in organizations.

*Dennis L. Dossett* is an Assistant Professor of Industrial/Organizational Psychology at the University of Nebraska at Omaha (Department of Psychology, College of Arts and Sciences, University of Nebraska, Omaha, NE 68182). He received both his M.S. and Ph.D. degrees in Psychology from the University of Washington and spent several years as a psychologist in the U.S. Air Force and in private industry. His research interests include motivation, performance evaluation, job design, and employee satisfaction.

*Randall B. Dunham* is an Associate Professor of Management in the Graduate School of Business and a faculty member of the Industrial Relations Research Institute at the University of Wisconsin-Madison. He received his Ph.D. from the University of Illinois in Industrial-Organization Psychology. Dr. Dunham's research includes job design, job satisfaction, prediction of performance, work schedules, and compensation issues.

*Michael J. Evanisko*, a doctoral candidate in Organizational Behavior from Yale University, is a management consultant with the Boston-based firm of Bain and Company. He received his M.A. and M.Phil. degrees from Yale in the Department of Administrative Sciences and has taught at Yale and the Graduate School of Business at Columbia University.

*Thomas W. Ferratt* is an Associate Professor of Management in the College of Business Administration at Drake University (College of Business Administration, Drake University, Des Moines, IA 50311). He received his Ph.D. from The Ohio State University. He has presented his research at regional and national meetings of the Academy of Management and AIDS. His research interests include the areas of productivity and managerial practices, job design, the measurement of job satisfaction and the human condition of organizations, and career patterns.

*Carl I. Greenberg* is an Associate Professor of Industrial/Organizational Psychology at the University of Nebraska at Omaha. He earned his M.A. and Ph.D. in Psychology from Wayne State University. His research interests include job redesign, employee motivation, and the effects of the physical environment on human behavior.

*Jon P. Howell* is an Assistant Professor of Management at New Mexico State University (Department of Management, College of Business Administration and Economics, New Mexico University, Box 3DJ, Las Cruces, NM 88003). He received his M.B.A. from the University of Chicago and his Ph.D. from the University of California at Irvine. Dr. Howell's current research interests include administrative leadership and health care administration. He has published several papers in these areas and has conducted training sessions for practicing managers.

*Daniel R. Ilgen* is an Associate Professor in the Industrial/Organizational area of the Department of Psychological Sciences at Purdue University. He received his Ph.D. in Industrial/Organizational Psychology from the University of Illinois. He spent a year as a visiting Assistant Professor at Illinois, followed by two years in the army as a member of the faculty of the U.S. Military Academy at West Point. In 1978-1979 he was a visiting Associate Professor in the Graduate School of Business at the University of Washington, Seattle, Washington.

*Naoki Kameda* is a Lecturer in Business Communications at Aoyama Gakuin University in Tokyo. He also is an executive with Tamon International, Inc.

*Jay S. Kim* is an Associate Professor of Organizational Behavior at The Ohio State University (440 Hagerty Hall, The Ohio State University, Columbus, Ohio 43210). Currently, he is studying the process of goal setting and feedback in industrial settings. His Ph.D. is from Michigan State University.

*John R. Kimberly* is an Associate Professor in the School of Organization and Management and in the Health Systems Management Group of the Institution for Social and Policy Studies at Yale University (Yale School of Organization and Management, Box 1A, New Haven, CT 06520). His recent research and writing has centered on the diffusion of medical innovations to hospitals, the formation and development of organizations, and the processes of organizational innovation and change. A member of the editorial boards of the *Administrative Science Quarterly* and the *Academy of Management Journal*, Dr. Kimberly recently completed a book with Robert Miles called *The Organizational Life Cycle*. Concerned with the application of organizational analysis to real problems, he consults with a number of organizations in the public and private sectors.

*Manuel London* is a district manager of Basic Human Resources Research, American Telephone and Telegraph Company. He holds a Ph.D. in Industrial/Organizational Psychology from Ohio State University. His research interests include conflict management, career planning, and management staffing decisions, and he has published articles on these topics in the *Journal of Applied Psychology, Academy of Management Journal, Personnel Psychology,* and *Journal of Vocational Behavior*. He coedited *Current Issues in Personnel Management* (Allyn and Bacon) and is currently co-authoring *Managing Career Progression* (Addison-Wesley).

*Joseph T. McCune* is a doctoral student in Industrial/Organizational Psychology at Michigan State University. He received his M.A. in Experimental Psychology at C. W. Post College, Long Island University, in 1979. His research interests include preretirement programs, realistic job previews, and organizational behavior modification.

*James O. Mitchel* is Director of Applied Behavioral Sciences for the Life Insurance Marketing and Research Association, Farmington, Conn. (P.O. Box 208, Hartford, CT 06144). He received his Ph.D. in Industrial Psychology from Bowling Green State University.

*Paula C. Morrow* is an Assistant Professor of Business Administration (Management) at Iowa State University (School of Business Administration, Iowa State University, Ames, IA 50011). Her research interests include organizational and interorganizational communication, the impact of interior office design on visitor response, turnover, job/work involvement, and retirement preparation. At present she is completing an empirical study on the reactions and attributions visitors make in response to office design elements.

*William W. Notz* is a Professor of Organizational Behavior in the Faculty of Administrative Studies and Adjunct Professor in the Department of Psychology at the University of Manitoba. He received his M.B.A. from the University of Denver and his Ph.D. from Northwestern University. He has a variety of research interests, including conflict management (with particular emphasis on final offer arbitration) and the evaluation of organizational innovations. In collaboration with several colleagues, he currently is preparing a book that is tentatively titled *The Experimenting Organization.*

*Richard B. Peterson* is a Professor of Management and Organization at the University of Washington. He received his Ph.D. in Industrial Relations from the University of Wisconsin. Dr. Peterson's research interests are in the areas of personnel, labor relations, and comparative management. His interests in comparative management focus principally upon the personnel and interpersonal problems of international firms and joint ventures operations in Japan.

*Jon L. Pierce* is an Associate Professor of Organization and Management in the School of Business and Economics, University of Minnesota, Duluth, Minnesota. He received his Ph.D. from the University of Wisconsin, Madison. His research interests include job design, alternative work schedules, and social system design and process.

*Thomas L. Ruble* is an Assistant Professor of Administrative and Behavioral Studies at Indiana University. He received his Ph.D. from the Graduate School of Management, University of California, Los Angeles. His current research interests include conflict behavior and women in management.

*Neal Schmitt* is a Professor in Industrial/Organizational Psychology at Michigan State University (Department of Psychology, Snyder Hall, Michigan State University, East Lansing, MI 48824). He received his Ph.D. from Purdue University in 1972. His current research interests include topics in decision making, personnel selection and measurement, and organizational behavior.

*Justin Shimada* is an Assistant Professor of Management at Portland State University. He received his Ph.D. in Business Administration from the University of Washington with special concentration on the areas of international business and business, government, and society. Dr. Shimada's research to date has focused on epistemological differences between Japanese and Western societies, as well as on the experience of nationalized firms in selected western European countries.

*Frederick A. Starke* is a Professor of Organizational Behavior in the Faculty of Administrative Studies at the University of Manitoba (Faculty of Administrative Studies, the University of Manitoba, Winnipeg, Manitoba, Canada R3T 2N2). He received his M.B.A. from Southern Illinois University and his Ph.D. from The Ohio State University. He is co-author of *Organizational Behavior: Concepts and Applications* (Merrill, 1980) and *Introduction to Canadian Business* (Allyn and Bacon, 1980), and has published articles on expectancy theory and final offer arbitration in the *Academy of Management Journal* and the *Administrative Science Quarterly*. His current research interests include individual decision making behavior and the use of third parties in conflict management. He also does research on the feeding habits of lake trout in Manitoba and the Northwest Territories.

*Stephen A. Stumpf* is an Associate Professor of Organizational Behavior at New York University, where he earned his Ph.D. in Business Administration (Graduate School of Business Administration, New York University, 90 Trinity Place, New York, NY 10006). He is the winner of the 1979 Wallace Dissertation Award. His research interests include judgmental decision making, career choice, managerial progression, and predicting turnover. His articles have appeared in the *Academy of Management Journal, Academy of Management Review, Personnel Psychology*, and the *Journal of Management*. He is currently co-authoring *Managing Career Progression* (Addison-Wesley).

*Jeremiah J. Sullivan* is an Assistant Professor of Business Communications at the University of Washington (Graduate School of Business Administration, University of Washington, Seattle, WA 98195). He is the author of *Pacific Basin Enterprise and the Changing Law of the Sea* (1977) and of *Foreign Investment in the U.S. Fishing Industry* (1979) with P. Heggelund. Dr. Sullivan's research interests encompass communications behavior in organizations in the areas of leadership, sex bias, and intercultural communications.

*M. Susan Taylor* is an Assistant Professor of Management at the University of Wisconsin–Madison (Graduate School of Business, University of Wisconsin, 1155 Observatory Drive, Madison, WI 53706). She received her Ph.D. in Industrial/Organizational Psychology from Purdue University in 1978. Dr. Taylor's current research interests include career development and the experiences of women working in traditionally male occupations.

*Michael C. White* is an Assistant Professor of Management at Louisiana State University (Department of Management, College of Business, Louisiana State University, Baton Rouge, LA 70803). He received his Ph.D. from the Department of Management at the University of Georgia in 1978. Dr. White's current research interests include research methodology, women in management, and the organization-environment interface.

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## NATIONAL ACADEMY

Academy of Management 42nd Annual Meeting
August 15-18, 1982

New York Hilton
New York, N.Y.

For further information contact:

John W. Slocum, Jr.
Vice President-Program Chair
Cox School of Business
Southern Methodist University
Dallas, Texas 75275
(214) 692-3157

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# THE ACADEMY OF MANAGEMENT—1982
# CALL FOR PAPERS
# 42ND ANNUAL NATIONAL MEETING, AUGUST 15-18, 1982
# NEW YORK HILTON, NEW YORK, NEW YORK

The program for New York will be initiated by the Professional Division Program Chairpersons. You are invited to submit an original paper or symposium in quadruplicate, via first class mail. *TO INSURE EQUITABLE TREATMENT, PAGE LIMITATIONS AND SUBMISSIONS DEADLINES WILL BE STRICTLY ENFORCED.* The following rules *must* be used in submissions:

(a) Type double spaced.
(b) Names, addresses, affiliations, and telephone numbers of all authors must be listed only on the first page.
(c) A separate abstract page on each paper should report the title, author(s), affiliations, division-interest group to which submitted, and an abstract no longer than 50 words. *Two additional* copies of the title-author abstract page should be submitted in addition to the four copies of the paper.
(d) Papers should be *no more than 15 pages* in length (including abstract, text, exhibits, footnotes and references).
(e) Symposium proposals in addition to (b) and (c) above also should have a 5-7 page overview statement, *as well as* a 3-5 page statement from *each* participant.

PAPERS, SYMPOSIA, ETC. SHOULD BE SENT DIRECTLY TO ONE OF THE PROGRAM CHAIRPERSONS LISTED IN THIS CALL. Papers should be submitted to a single chairperson. If the content is judged more suitable for another Division or Interest Group, the paper will be forwarded to the appropriate chairperson and the authors notified. If you submit different papers to two or more chairpersons, please inform those chairpersons so that conflicts in the program schedule can be avoided.

ALL program participants must register for the conference. Participants must present their papers; there can be no no-shows. The Academy does *not* pay travel to or from the meeting for program participants.

Papers will be judged by Program Committees on the basis of:
(a) Originality (It is the policy of the Academy that only original papers can be presented.)
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The *Proceedings* will be published by photo-offset process, with camera-ready copy prepared by the authors. Specifications regarding style will be supplied later to authors whose papers are selected for publication. Only a select group of papers, as judged by the Program Committees, will be published in full in the *Proceedings*. All other papers selected for presentation will be represented by a 50 word abstract. All papers published in the *Proceedings* may be submitted for consideration for publication in *The Academy of Management Journal* and *The Academy of Management Review*.

The deadline for *receipt* of all submissions is January 11, 1982. *No papers can be accepted after this date.* The following material includes a list of specific instructions provided by individual Divisions and Interest Groups. Names, addresses, and phone numbers for the Program Chairpersons of each Division or Interest Group also are listed.

John W. Slocum
Vice-President and Program Chair
Edwin L. Cox School of Business
Southern Methodist University
Dallas, TX 75275
(214) 692-3157

# SPECIAL INSTRUCTIONS FOR PROFESSIONAL DIVISIONS AND INTEREST GROUPS

## BUSINESS POLICY AND PLANNING

The Division invites submission of papers and symposia covering empirical research, theory development, and teaching concerns on all aspects of business policy and planning. The submission of doctoral dissertations to be considered for two cash awards is also encouraged.

## CAREERS

We invite papers, symposia, panels, and workshops on theory, research, and practice in the career development and management field. Topics at both the individual and organizational level are solicited and include, but are not limited to, tests of theoretical frameworks, evaluations of field interventions, and integration of career theories.

## HEALTH CARE ADMINISTRATION

This division invites papers and symposia on a variety of Health Care Management topics, problems and issues. These include: planning and policy in health organizations, forecasting models, turnover, professionalism or stress among health care personnel, international health, research methods, labor relations, teaching techniques, in health care administration programs, multi-institutional systems, and other relevant topics. An award is given to the best paper.

## INTERNATIONAL MANAGEMENT

Submissions are encouraged that 1) deal with international *management* in industrialized countries, 2) advance theory, 3) apply research methodology in new areas, and 4) contain research or conceptual work on "ignored" topics. The above notwithstanding, all papers are welcome with open arms and will be objectively blind reviewed. Don't forget to submit panel and workshop proposals!

## MANAGEMENT EDUCATION AND DEVELOPMENT

The MED Division invites papers and proposals for symposia, workshops, and tutorial sessions on process and content issues in management education and management development. Papers and symposia which advance theory or apply rigorous research methodologies to pertinent topics are especially encouraged. Proposals for workshops or tutorial sessions offering insights on instructional delivery, materials devleopment, and/or evaluation techniques are also welcome. The division will recognize the best paper by presenting a monetary award for superior scholarship.

## MANAGEMENT HISTORY

The Division invites papers related to relevant topics of historical interest. Some areas for consideration are: a) contributions and/or biographies of important management personalities; b) the development and/or comparisons of various management philosophies; and c) the future of management thought. Proposals for symposia and panels are also welcomed.

## MANAGERIAL CONSULTATION

The Division invites papers and proposals for discussion panels and symposia on all aspects of consultation. Examples of areas for submission include process conceptualizations, methodologies and assessments, interchanges with professional consulting firms, and case studies.

## ORGANIZATION BEHAVIOR

The Division will give two recognition awards: one for the best competitive paper (may be coauthored) and one for the best competitive paper based on a dissertation (dissertation papers must not be coauthored and must be clearly identified as a dissertation paper). Reviewers of *all* papers and symposium proposals will use, as one of their evaluation criteria, the degree to which the paper addresses critical real-world organizational problems.

## ORGANIZATIONAL COMMUNICATION

Papers are invited on all topics related to organizational communication. Topics might include theoretical and empirical work on interorganizational communication, cross-cultural organizational communication, information systems, research methodology, and pragmatic organizational communication issues of relevance to practitioners. The author(s) of the best paper will receive an award in recognition of superior scholarship.

## ORGANIZATION DEVELOPMENT

Papers and symposia are invited on all aspects of OD, particularly on integrating theory, research, and practice. Areas of special interest include: theories of organization change, conceptual foundations of OD practice, empirical assessment of OD interventions, and field studies elucidating OD theory and practice. The Division encourages contributions aimed at theoretical and research development of the OD field.

## PERSONNEL/HUMAN RESOURCES

Papers and symposia are invited on all employment topics. Empirical, conceptual, and literature reviews of the impacts of personnel/human resources activities on individuals, jobs, and organizations are appropriate. These include, but are not limited to, topics such as human resource planning, performance appraisal, selection, training, motivation, and labor relations. Doctoral student papers are encouraged. A $200 prize is awarded for the best competitive paper.

## PRODUCTION/OPERATIONS MANAGEMENT

Research, theory and position papers and symposium panel and workshop proposals are invited. Papers and proposals involving state-of-the-practice are especially encouraged. Topics of special concern include the production policies and methods of foreign manufacturers and innovations in teaching and conceptualizing P/OM.

## PUBLIC SECTOR DIVISION

Papers on management or policy analysis issues in public, quasipublic and not-for-profit sectors are welcome. In addition, studies comparing structural, environmental, and technological variables for organizations in these sectors versus the private sector are welcome. A $100 prize will be awarded for the best competitive paper.

## SOCIAL ISSUES IN MANAGEMENT

The Division invites papers and symposia on all aspects of the corporation-society relationship and encourages empirical or theoretical contributions in the following areas: corporate political action, environmental analysis and planning, business ethics, social issues in cross-cultural settings, government-business interactions, management of the public affairs/social policy process, and future business-society relations. Doctoral papers are encouraged.

## ENTREPRENEURSHIP

The interest group invites submission of papers and symposia dealing with entrepreneurship. Papers describing empirical research are especially encouraged. Submission of doctoral dissertations for a cash award is also invited.

## R&D/TECHNOLOGY/INNOVATION

This interest group invites papers and symposia on all aspects of R&D/Technology/Innovation management. Papers addressing innovation in various types of organizations, technology and organization design, technology transfer, and the management of R&D personnel, careers, and organizations are welcome. Conceptual, empirical, and application-oriented papers are all of interest.

## WOMEN IN MANAGEMENT

The interest group solicits papers and symposium proposals that examine significant issues that face women in organizations and/or explore sex differences. Priority will be given this year to theoretical papers and empirical studies that advance theory. Especially encouraged are papers and proposals that examine the effects of organizational structure, institutional constraints, socioeconomic factors, and organizational routines on the careers and work lives of women, though all topics will be considered.

# PROGRAM CHAIRS—1982
# ACADEMY OF MANAGEMENT

## PROFESSIONAL DIVISIONS

1. BUSINESS POLICY AND PLANNING
Larry Jauch
Department of Administrative Sciences
Southern Illinois University
Carbondale, IL 62901
(618) 454-3307 (office); (618) 549-6767 (home)

2. HEALTH CARE ADMINISTRATION
Stephen Strasser
School of Allied Medical Sciences
Program in Hospital and Health Services Administration
1583 Perry Street
Ohio State University
Columbus, OH 43210
(614) 459-5007

3. INTERNATIONAL MANAGEMENT
Edwin Miller
Graduate School of Business
University of Michigan
Ann Arbor, MI 48109
(313) 764-1408 (office); (313) 665-0045 (home)

4. MANAGEMENT EDUCATION AND DEVELOPMENT
John R. Schermerhorn
College of Business and Administration
Southern Illinois University
Carbondale, IL 62901
(618) 453-3328 (office); (618) 549-3110 (home)

5. MANAGEMENT HISTORY
William Muhs
Department of Management
Washington State University
Pullman, WA 99164
(509) 335-4458 (messages 3507);
(509) 332-7824 (home)

6. MANAGERIAL CONSULTATION
Terry L. Maris
The Kroger Company
P.O. Box 1199
Cincinnati, OH 45201
(513) 762-1211 (office); (606) 266-7741 (home)

7. ORGANIZATION BEHAVIOR
John M. Ivancevich
Department of Organizational Behavior and Management
312 McElhinney Building
College of Business
University of Houston
Houston, TX 77004
(713) 749-7227 (office); (713) 376-3203 (home)

8. ORGANIZATIONAL COMMUNICATION
John D. Hatfield
Department of Management
College of Business
University of Georgia
Athens, GA 30602
(404) 542-1294 (office); (404) 543-5490 (home)

9. ORGANIZATION DEVELOPMENT
Don Warrick
School of Business Administration
University of Colorado
Colorado Springs, CO 80907
(303) 593-3407 (office); (303) 488-3626 (home)

10. ORGANIZATION AND MANAGEMENT THEORY
Robert Miles
Graduate School of Business
Harvard University
Boston, MA 02163
(617) 495-6375

11. PERSONNEL/HUMAN RESOURCES
Dick Beatty
Graduate School of Business Administration
Box 419
University of Colorado
Boulder, CO 80309
(303) 492-6118 (office); (303) 494-4027 (home)

12. PRODUCTION/OPERATIONS MANAGEMENT
James J. Weeks
Department of Business Administration
College of Business
University of North Carolina at Greensboro
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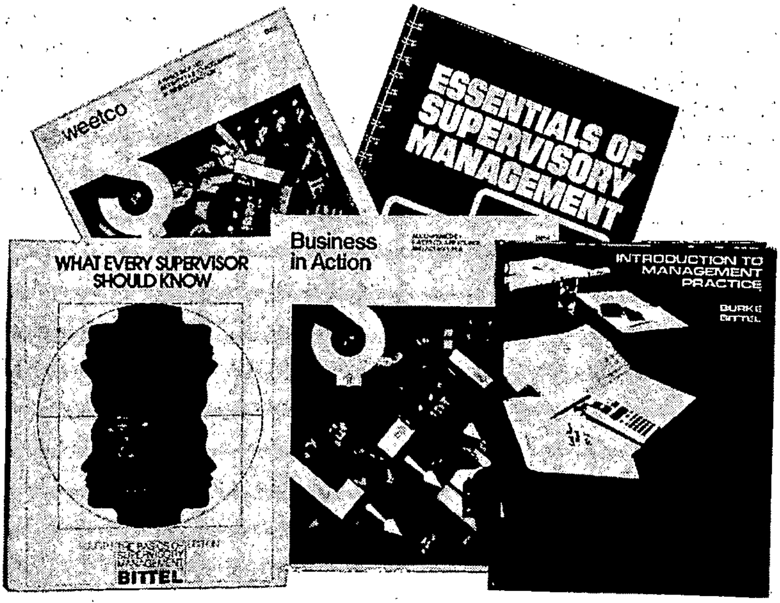
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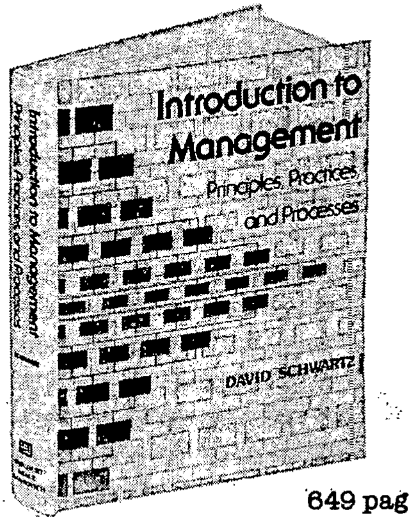

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